Raymarine®

09

WIDESCREEN EDITION

RAYMARINE 09

| RADAR | NAVIGATION AIDS | INSTRUMENTS | AUTOPILOTS | COMMUNICATIONS I SATELLITE TV | LIFETAG | SOFTWARE | SYSTEMS |

Copyright Classic Boat Magazine

WELCOME

Smart on the inside, simple on the outside: that's the Raymarine advantage.

Our products combine industry-leading technology with intuitive design, to deliver a range that's ideally suited to the needs of today's boater – whether it's a round-the-world race or a weekend fishing trip.

We specialise in marine electronics. Backed up with years of research and customer feedback, this focus has allowed us to create a range that offers high performance and reliability, as well as exceptional ease of use: making sure you get the information you need quickly and easily.

And, backing it all up is Raymarine's service commitment: outstanding warranty and technical support – a worldwide network, providing total peace of mind wherever your boating takes you.

Welcome to Raymarine. Enjoy the advantage.

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SUGGESTED SYSTEMS

Installation gallery

Whether you're fitting out a 17' fishing boat or a 100' cruiser, Raymarine has the equipment you need: single screen solutions or networked systems, with the performance and ease of use you expect from Raymarine.

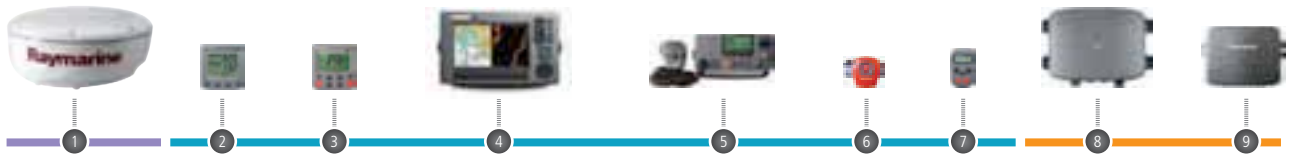
Over the next eight pages, you'll find a gallery of real-world marine installations for powerboats and sailboats of various sizes; we understand that boat owners have their own particular preferences and each boat its own particular needs – we hope the gallery will give you an idea of what is possible and that it will provide an inspirational starting point to specifying your own Raymarine system.

Power: 8.6m (28ft)

1. A Series Chartplotter/Chartplotter Fishfinder
2. Sport Drive Autopilot
3. LifeTag System (up to 16 tags)
4. Ray49E VHF Radio

Power: 8.6m (28ft) to 10.7m (35ft)

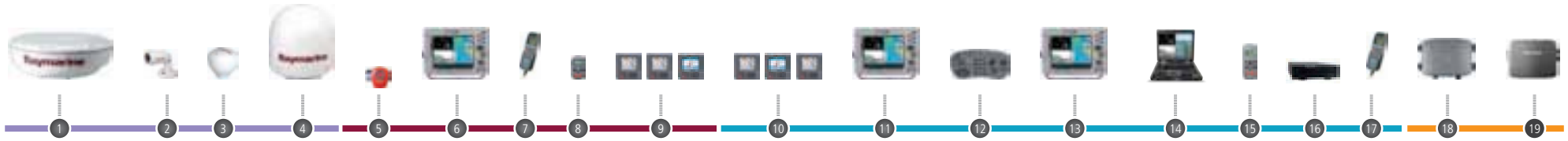
Radar Arch Helm Below Deck



1. 4kW Digital Radome Scanner
2. ST60+ Tridata Display
3. ST6002 Autopilot Control Head
4. C Series Widescreen Display
5. Ray218E VHF radio
6. LifeTag System (up to 16 tags)
7. S100 Wireless Autopilot Remote
8. DSM30 HD Digital Fishfinder Module
9. AIS250 Receiver

Power: 10.7m (35ft) to 15.4m (50ft)

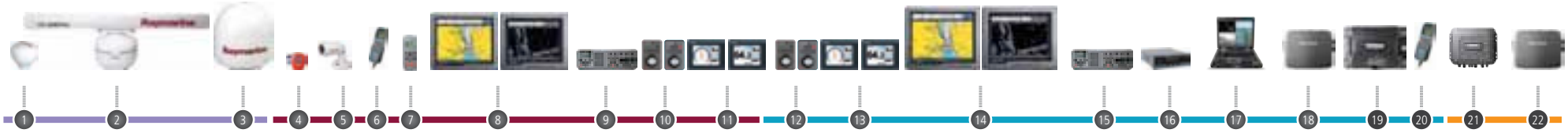
Radar Arch · Flybridge · Main Helm · Below Deck



1. 4kW Digital Radome Scanner
2. Video Cameras (x2)
3. Raystar125 SDGPS Antenna
4. 37STV Satellite TV Antenna System
5. LifeTag System (up to 16 tags)
6. E80 Multifunction Network Display
7. Ray240E VHF Remote Handset and External Speaker
8. S100 Wireless Autopilot Remote
9. ST70 Multifunction Instruments and Autopilot
10. ST70 Multifunction Instruments and Autopilot
11. E120 Multifunction Network Display
12. SeaTalk^2 Keyboard
13. E120 Multifunction Network Display
14. RayTech Software Running on a PC
15. SmartController Wireless Remote
16. 37STV Satellite TV Antenna Control Unit
17. Ray240E VHF Radio and External Speaker
18. DSM300 HD Digital Module
19. AIS250 Receiver

Power: Over 15.4m (50ft)

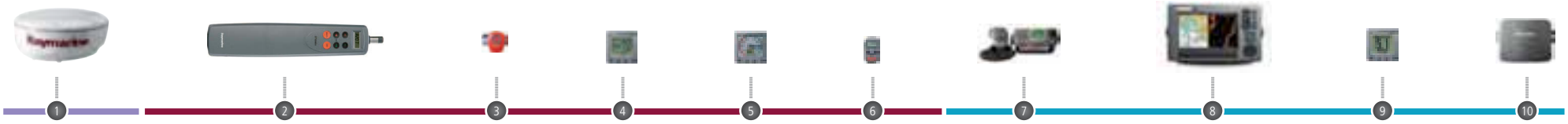
Radar Arch Flybridge Main Helm Below Deck



1. Raystar125 SDGPS Antenna
2. 4kW HD Digital Open Array Scanner
3. 60STV Satellite TV Antenna System
4. LifeTag System (up to 16 tags)
5. CAM100 Video Camera (x2)
6. Ray240E Remote Handset and Speaker
7. Smartcontroller Remote
8. G150 Multifunction Network Displays
9. G Series Keyboard
10. ST70 Plus Instrument and Autopilot Keypads
11. ST70 Plus Instruments
12. ST70 Plus Instrument and Autopilot Keypads
13. ST70 Plus Instruments
14. G190 Multifunction Network Displays
15. G Series Keyboard
16. 60STV Satellite TV Antenna Control Unit
17. RayTech Software Running on a PC
18. GVM400 Video Hub
19. GPM400 Processor (x2)
20. Ray240E VHF Radio
21. DSM400 HD Digital Module
22. AIS250 Receiver

Sailboats: up to 8.6m (28ft)

Mast Cockpit Below Deck



1. 4kW Digital Radome Scanner
2. ST2000 Tillerpilot
3. LifeTag System (up to 16 tags)
4. ST60+ Tridata Instrument
5. ST60+ Wind Instrument
6. S100 Wireless Remote
7. Ray49E VHF Radio
8. C90 Multifunction Widescreen Display
9. ST60 Graphic
10. AIS250 Receiver

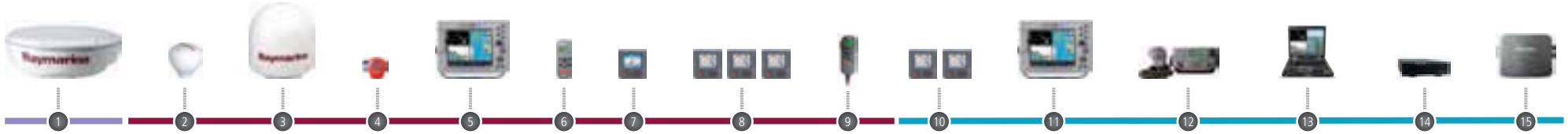
Sailboats: 8.6m (28ft) to 10.7m (35ft)

Mast Cockpit Below Deck

1. 4kW Digital Radome Scanner
2. LifeTag System (up to 16 tags)
3. ST60+ Tridata Instrument
4. ST6002 Autopilot
5. ST60+ Wind Instrument
6. C90 Multifunction Widescreen Display
7. RayMic Second Station VHF Handset
8. SmartController Wireless Remote
9. Ray55E VHF Radio
10. AIS250 Receiver
11. ST60+ Graphic Instrument

Sailboats: 10.7m (35ft) to 15.4m (50ft)

Mast Cockpit Below Deck



1. 4kW Digital Radome Scanner
2. Raystar125 SDGPS Antenna
3. 37STV Satellite TV Antenna
4. LifeTag System (up to 16 tags)
5. E80 Multifunction Network Display
6. SmartContoller Wireless Remote
7. ST70 Autopilot Control Head
8. ST70 Multifunction Instruments
9. RayMic Second Station VHF Handset
10. ST70 Multifunction Instruments
11. E80/E120 Multifunction Network Display
12. Ray218E VHF Radio
13. RayTech Software Running on a PC
14. 37STV Satellite Antenna Control Unit
15. AIS250 Receiver

Sailboats: over 15.4m (50ft)

Mast Cockpit Below Deck

1. Raystar125 SDGPS Antenna
2. 4kW 48" Super HD Open Array
3. 37STV Satellite TV Antenna
4. ST70 Plus Instruments
5. LifeTag System (up to 16 tags)
6. Ray240E VHF Handset with External Speaker
7. SmartController
8. G170 Multifunction Network Display
9. G Series Mini Keyboard
10. ST70 Plus Instrument and Autopilot Keypads
11. ST70 Plus Instruments
12. ST70 Plus Instrument Keypad
13. ST70 Plus Instruments
14. G170 Multifunction Network Display
15. G Series Keyboard
16. RayTech Navigation Software Running on a PC
17. Ray240E VHF Radio
18. 37STV Satellite TV Antenna Control Unit
19. AIS500 Transceiver
20. GPM400 Processor

8.2
13.1

G SERIES – POWER AND VERSATILITY AT ITS BEST

G Series is a complete multifunction navigation and entertainment solution that offers unmatched visualisation capabilities and versatility. Combine ultra bright displays, networked processing and premium sensors to create the custom solution that is right for you.

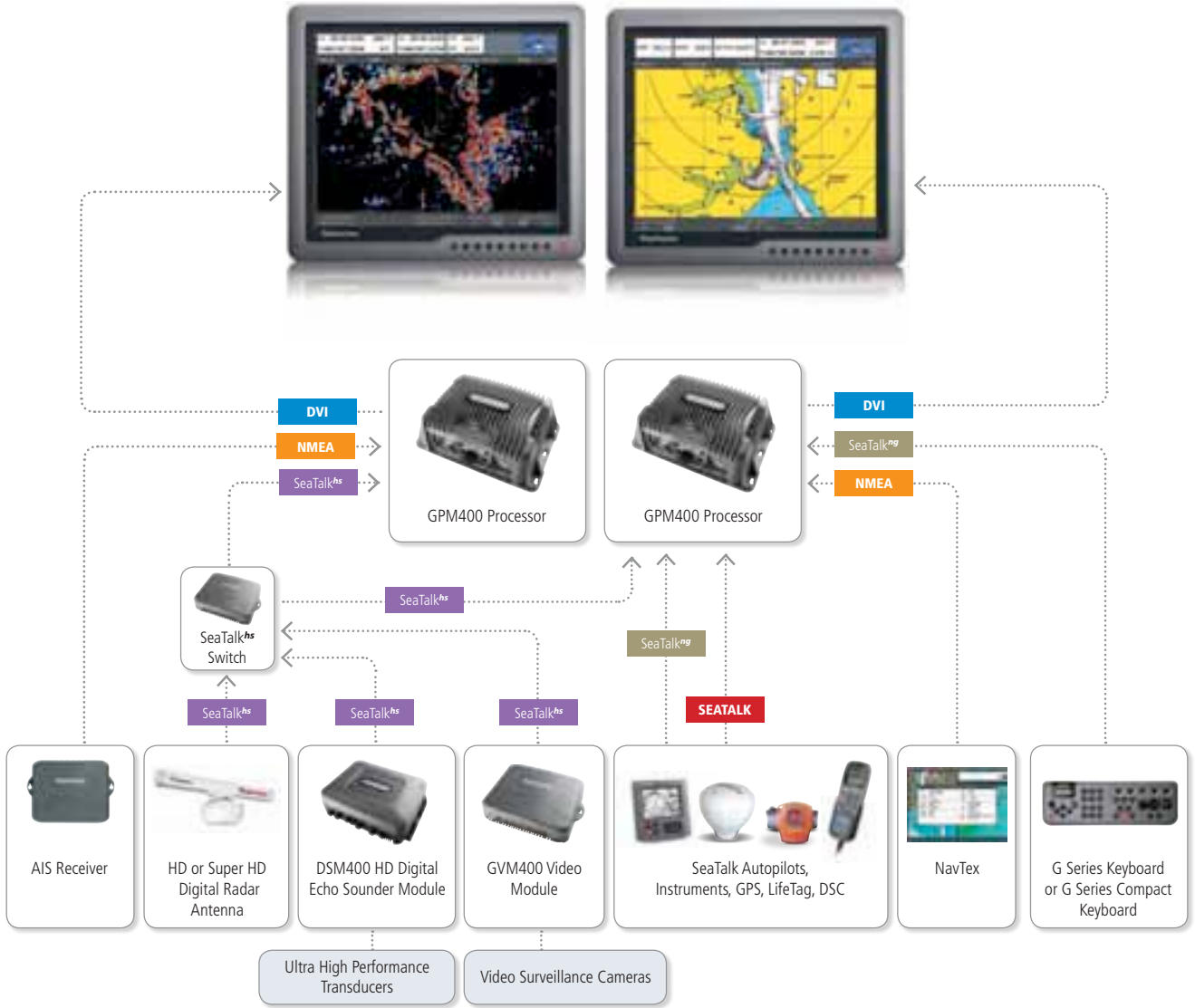
Raymarine's premier navigation system, G Series Ultra High Performance Network features;

- 3D Chartplotter with embedded Navionics Platinum cartography.
- HD Digital Radar and Super HD Digital radar.
- HD Digital fishfinder.
- Networked video including cameras.
- AIS (Automatic Identification System).
- NAVTEX compatibility.

GOTO pages 88 – 89 for product specifications

G SERIES SYSTEM OVERVIEW

This diagram gives an overview of the G Series system possibilities; the number of configurations available are almost endless. For detailed information and advice on tailoring a system to your exact requirements, please contact your nearest Raymarine stockist. To find your nearest Raymarine stockist please use the Dealer locator on **www.raymarine.co.uk**



G SERIES INTEGRATION AND TECHNOLOGY

More than just navigation, G Series is a total onboard information and command system with unmatched input possibilities.

Performance. At the heart of every G Series system is the powerful GPM400 Processor which has 10 times the processing speed of conventional marine electronics. Super-fast PC-like performance with the reliability of an embedded navigation device and multiple processor modules that can be networked together.

Networking. The super-fast 100 megabit SeaTalk***hs*** network enables plug and play integration of multiple processor modules, marine displays and navigation stations. The SeaTalk***ng*** next generation data bus is the robust CAN-based data backbone that integrates Raymarine SeaTalk***ng*** instruments and NMEA 2000 compatible engine, generator and instrument systems.

Displays. Ultra bright sunlight viewable displays for high-resolution navigation data and imagery. View 3D charts, radar, fishfinder and video in absolute clarity; resolutions up to 1280 x 1024 (SXGA).

Camera Integration. The GVM400 video module enables for 4 simultaneous video streams from any display system. Raymarine's SeaTalk***hs*** network gives simultaneous access to every onboard video source from multiple G Series navigation stations.

Command Centre Keyboard and Compact Keyboard. Each G Series component intelligently networks with one another. The entire system can be controlled by the easy-to-use G Series control keyboard. Wired or wireless, the G Series keyboard controls single or multiple G Series navigation stations. The new Compact Keyboard is the ideal solution to space-limited G Series installations.

HD Digital and Super HD Digital Radar Antennas. G Series supports Raymarine's new HD and Super HD Digital Radar Technology. HD Digital Radar's advanced Digital Signal Processing (DSP) effectively delivers the performance of a much larger, higher powered radar antenna.

HD Digital Fishfinders. G Series incorporates Raymarine's most powerful patented HD Digital fishfinder technology using the ultra high-performance DSM400 Digital Sounder Module. Equipped with 4 independent sonar transceivers and up to 3kW of output power, the DSM400 sets the new standard in fishfinder performance for the serious sport fisherman. Alternatively, lower output power is available using the DSM300 (12/24v) or the DSM30 (12v only) Digital Sounder Modules.

AIS250 Receiver and AIS500 Transceiver
Operating in the VHF maritime band, the AIS system enables the wireless exchange of navigation status between vessels and shore-side traffic monitoring centres. Commercial ships, ocean-going vessels and other boats equipped with AIS transmitters broadcast AIS messages that include the vessel's name, course, speed and current navigation status. The AIS250 receives data and the AIS500 receives and transmits data.

G Series Monitors. Built around a rugged aluminium chassis for strength and durability, the G Series low-profile monitors exude quality. Choose from G120 12", G150 15", G170 17" and G190 19" ultra bright LCD displays. Features include:

- High resolution: 12" and 15" 1024 x 768 pixels (XGA), 17" and 19" 1280 x 1024 pixels (SXGA).
- Adjustable backlighting for all lighting conditions, even in direct sunlight.
- Superb visibility in low-light conditions; night mode that dims to red.
- Great contrast, reduced reflections, optimal direct sunlight visibility, condensation prevention bonded glass and anti-reflective glass filter.
- Unmatched video inputs: 3 VGA, 2 DVI, 3 composite video and 1 S-Video.
- Immediate access to each video input source via direct access keys located on the bezel.
- Remote control; navigate menus, change inputs, adjust brightness or power down using the G Series Keyboards via the Ethernet port.
- Shortcuts to brightness, night mode and PIP (picture in picture).
- Resize and reposition PIP anywhere on the display.
- Easy access via On Screen Display menus for advanced display management.

NAVIONICS Platinum NAVIONICS Gold

GPM400 PROCESSOR

The GPM400 Processor Module features include:

- High-speed processor.
  - Entire Navionics Gold worldwide cartography library loaded on internal hard drive.
  - Three unique GPM400 models pre-loaded with the Navionics Platinum US, Europe or Rest of World regions.
  - CompactFlash Navionics charts available for areas outside the preloaded region.
- Platinum cartography features includes: 3D cartography, aerial photo chart overlays, enhanced port services, panoramic port photos and animated tides and currents.
- 2 high resolution DVI outputs (up to 1280 x 1024 pixels) for connection of high resolution monitors/displays.
- SeaTalk*hs* 100Mb network ethernet port.
- SeaTalk port for connecting Raymarine instruments, autopilots and GPS.
- SeaTalk*ng*/NMEA 2000 port.
- 2 NMEA 0183 input and output ports for connecting NMEA compatible marine equipment such as NavTex and AIS collision avoidance receivers.

DSM400 HD DIGITAL SOUNDER MODULE

High definition HD Digital echo sounder technology offers unrivalled clarity and detail below the waves. See and target individual fish. Observe the sea bed structure in detail unimaginable with traditional sounder technology. The DSM400 is Raymarine's latest next generation HD Digital sounder processor.

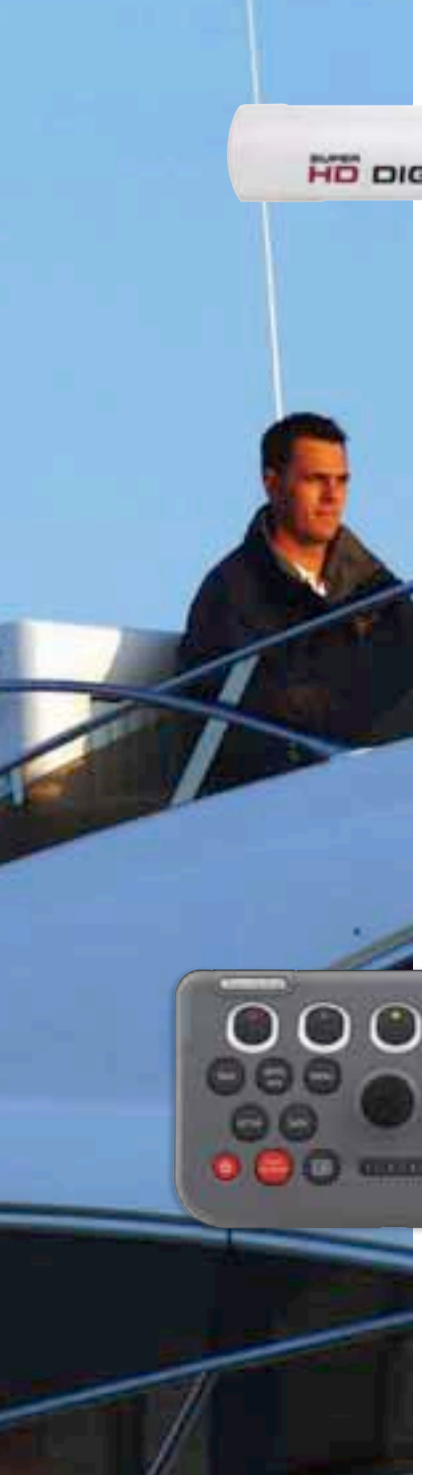
- Rugged, waterproof aluminium construction.
- 1, 2 or 3kW RMS power output (dependent on the transducer used).
- Multiple operating frequencies and multiple transducers – 28, 38, 50, 185 and 200kHz. Further manual adjustment between frequencies available for ultra flexibility.
- Four transceivers enable simultaneous monitoring of four individual frequencies (transducer capability dependent).
- Compatible with the new ultra high-performance transducers, including broad bandwidth and widebeam.
- SeaTalk*hs* network compatible.

GVM400 VIDEO MODULE

The GVM400 video module distributes composite video using the Raymarine SeaTalk*hs* network.

- Enables composite video to be viewed within a G Series application window.
- Channels multiple video inputs e.g. security/surveillance cameras into a single source.
- Add a second GVM400 video module to monitor and network up to 8 cameras.

GOTO pages 89 & 99 for product specifications



SUPER HD DIGITAL AND HD DIGITAL RADAR ANTENNAS

Perfect for the new G Series, the Raymarine Super HD Digital and HD Digital radar antennas deliver unmatched performance and ease-of-use. Maximising digital radar receiver performance, HD Digital Radar technology enables Raymarine radars to deliver target detection to rival much larger and more powerful radar systems.

- HD Digital technology virtually eliminates noise for superior target detection and detail and substantial improvements in range and bearing resolution.
- New automatic operating modes; Coastal, Harbour, Offshore and Buoy.
- HD Digital delivers target resolution comparable to much larger radar antennas.
- Variable beam width boosts target detection and resolution.
- Multi-level colour target display.
- SeaTalk*hs* compatible.
- Choice of 48" and 72" HD Digital 4kW and 12kW open arrays.

G SERIES KEYBOARDS

Wired or wireless, the intuitive G Series Command Centre Keyboard provides an elegant interface to all points on the network. Additionally, the Compact Keyboard is available for space-limited installations.

COMMAND CENTRE KEYBOARD

- Controls single or multiple G Series displays. LCD identifies the monitor under control.
- Can be interfaced with multiple GPM400 processors.
- Alphanumeric keypad for editing/entering data, such as waypoint names.
- Intuitive colour-coded softkeys select corresponding functions identified by on-screen labels.
- Dedicated autopilot control keys.
- Dedicated function keys for instant access to frequently used features.
- Twist 'n' click to edit alphanumeric values and fast scrolling of lists and menus.
- Trackpad to control the on-screen cursor and also scroll menus.
- Range key to zoom in and out on chart and radar screens to reveal more detail and information.
- Wired keyboard as standard (wireless option available).

G SERIES COMPACT KEYBOARD

Small yet powerful, the G Series Compact Keyboard offers G Series control while utilising a minimum amount of dash space. The new Compact Keyboard retains core G Series functionality while providing a clean unobtrusive appearance in a reduced footprint.

- Control up to four GPM400 processor and four G Series displays.
- LED indicators identify which display is in use and radar status.
- Intuitive colour coded softkey interface.
- Mix and match Compact Keyboard and Command Centre Keyboard on any G Series system.

GOTO pages 89 & 94 for product specifications

AIS	LIFETAG	GPS ANTENNA	COMMUNICATIONS	AUTOPILOTS	VIDEO CAMERAS	INSTRUMENTATION
P44	P42	P35	P84	P66	P44	P52

E SERIES MULTIFUNCTION SYSTEMS

E Series combines chartplotter, fishfinder (sonar), radar, instrument data and onboard video displays into an easy-to-use navigation network.

Raymarine's award-winning E Series gives you everything you need at your fingertips from a marine display in a single multifunction package. Add in powerful 3D graphics, unbeatable functionality and a high-bright screen you can view even in direct sunlight, and you really have got the whole picture.

General Features
- Display chartplotter, fishfinder, radar, video, instrument data, engine data.
- Single, dual or multi-station operation.
- Connect remote cameras or onboard video entertainment sources.
- Access engine instrument data.
- Support for Navtex weather forecasts and weather warnings.
- AIS collision avoidance information when used with a compatible receiver.
- Engine monitoring support for NMEA 2000 and J1939 compatible engines.
- Customisable instrument and data screens, includes compass rose and sea temperature graph.

Display Features
- Bright 256 colour enhanced high resolution TFT displays.
- Fast screen redraw and enhanced graphics.
- Wide viewing angle.
- Prismatic light enhancing screen with integrated anti-reflective screen filter.

Network Features
- SeaTalk***hs*** High Speed Network – 10x faster than leading marine networks.
- Instantly transfer radar, chartplotter, fishfinder and navigation functions between your E Series displays.
- Single, dual or multi-station configurations.
- Simple setup – no hassle 'plug and play' network with no confusing protocols.
- Network up to 8 network devices/ displays with an 8 port network switch.
- Easy autopilot and instrument integration with Raymarine SeaTalk and SeaTalk^2.
- On screen DSC VHF Position Reports.
- SeaTalk, SeaTalk^2, SeaTalk***hs***, NMEA 0183, NMEA 2000 compatibility.
- Put in the work at home – RayTech RNS 6.1 and SeaTalk***hs*** plug/play networking with your PC.
- Compatible with Raymarine's LifeTag wireless man overboard system.

Radar Features

- Radar/chart overlay.
- Dual Range radar. HD or SHD Digital Signal Processing Dual antenna capability.
- See what's coming – MARPA (Mini Automatic Radar Plotting Aid) target tracking (using fast heading input (gyro) course computer).
- Overlay multiple waypoints on the radar and create waypoints directly on the radar display.
- Relative or True Motion.
- Head Up, Course Up or North Up mode.
- Auto GST™ automatic control of gain, sea clutter and tune.
- Radome or open array antenna options including HD Digital domes and HD and Super HD digital open arrays.
- 72nm max range (dependent on scanner type, position and conditions).
- Power saving Timed Transmit mode.

Chartplotter Features

- Relative, True and Auto-ranging motion modes – view your chart the way you like it.
- Head Up/North Up/Course Up chart rotation modes.
- Screen offset for maximum 'look ahead' chart display.
- Waypoint navigation and multiple waypoint overlay plus 1200 waypoints with 16-character naming.
- 10 track memories with 1000 points per track.
- SmartRoute™ converts tracks into waypoints and waypoints into a route.
- Save your favourite passages; up to 150 routes with up to 50 waypoints per route.
- Uses the Raystar125 GPS sensor (available separately) for Satellite Differential GPS accuracy.

Cartography

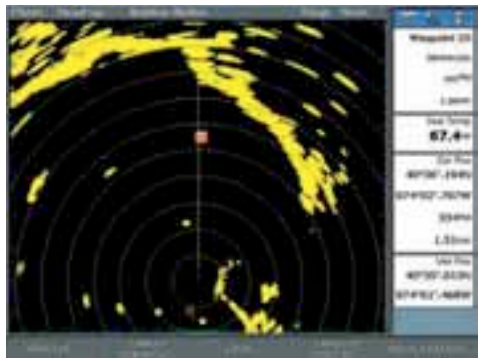
- Navionics cartography on Compact Flash memory cards.
- Familiar 'paper like' appearance with uncluttered charts on every range scale.
- Navionics Gold, Gold Plus, Platinum and Platinum Plus.

Fishfinder Features

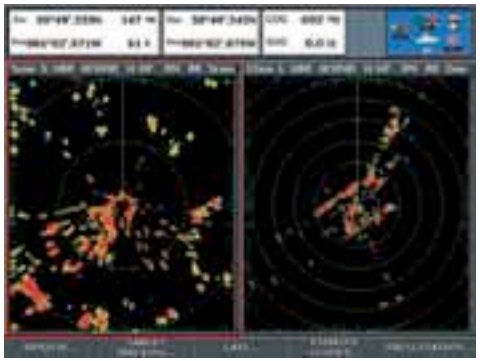
- HD Digital fishfinder technology*.
- Uses DSM300 (12/24v) Digital Sounder Module or DSM30 (12v only). Compatible with DSM400 (12/24v).
- 600 or 1000 Watt high performance and ultra high performance transducer options.
- A-Scope real time sonar display.
- Zoom into any portion of the water column for incredible detail.
- Auto Adaptive Digital transmitter/receiver.
- Dual frequency 200/50kHz operation.

* This revolutionary technology will change your fishing world, delivering sparkling clarity and fine detail that you won't find on conventional fishfinders. For a brief introduction to HD Digital, go to page 38. For detailed information on the benefits of HD Digital technology, please visit our website **www.raymarine.co.uk**

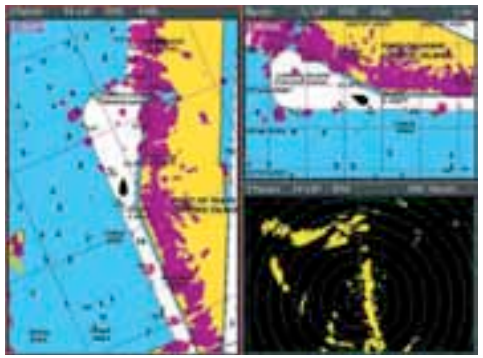
Radar screen with waypoint overlay. Screen also shows navigation data (right).



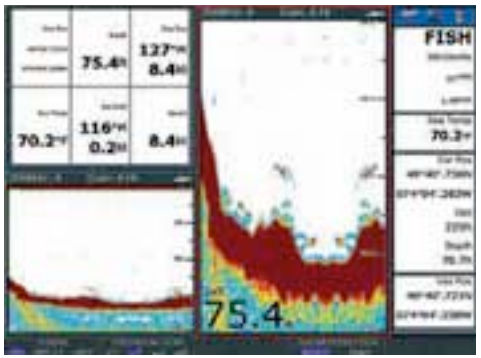
Dual Range HD Digital Radar. Split screen showing typical dual-range with 1/4nm and 12nm selected.



Chart/Radar Overlay. Radar image overlaid onto the corresponding chart.



Fishfinder. Zoomed view (lower left) of the main fishfinder image and navigation data in data bar.



1 Chart Port
Install your charts stored on Compact Flash memory cards.

2 Soft Keys
Select corresponding functions identified by on screen labels.

3 Track Pad
Used to control on screen cursor and scroll through menus.

4 Dedicated Keys
Seven keys with dedicated functions.

5 Range Key
Used to zoom in and out.

6 Twist 'n ' Click
Edit alphanumeric values and scroll through lists.

SEATALK² NAVIGATION KEYBOARD

Raymarine's SeaTalk² Navigation Keyboard takes advantage of the powerful E Series interface through dedicated navigation buttons and intuitive softkeys. A built in cursor and rotary knob are standard, along with a convenient alphanumeric keypad. Designed to be both "built-in" and handheld, the SeaTalk² Navigation Keyboard's mounting cradle mounts flush in the dash and allows the keyboard to be removed for convenient hand held operation.

GOTO page 90 for product specifications

E80 (8") Display.

E120 (12") Display.

Instrument Data
- Raymarine's SeaTalk and SeaTalk^2 protocols for Raymarine integration with your Raymarine instruments.
- Seamless integration with Raymarine's instruments and autopilot systems.
- NMEA 0183 and NMEA 2000.
- Using the page and window customisation controls, instrument data can be repeated either in full screen or within a window.

Engine Data
- Customisable engine instrument data / engine monitoring (subject to compatibility).
- Data includes: tachometer, voltage, oil pressure, fuel level, fuel consumption and coolant temperature.
- Supports single and dual engines.
- Choose from 5 engine data display combinations.

AIS250 Receiver and AIS500 Transceiver
Operating in the VHF maritime band, the AIS system enables the wireless exchange of navigation status between vessels and shore-side traffic monitoring centres. Commercial ships, ocean-going vessels and other boats equipped with AIS transmitters broadcast AIS messages that include the vessel's name, course, speed, and current navigation status. The AIS250 receives data and the AIS500 receives and transmits data.

- AIS data input support.

Navtex Weather Forecasts & Warnings
- Navtex weather data input support.

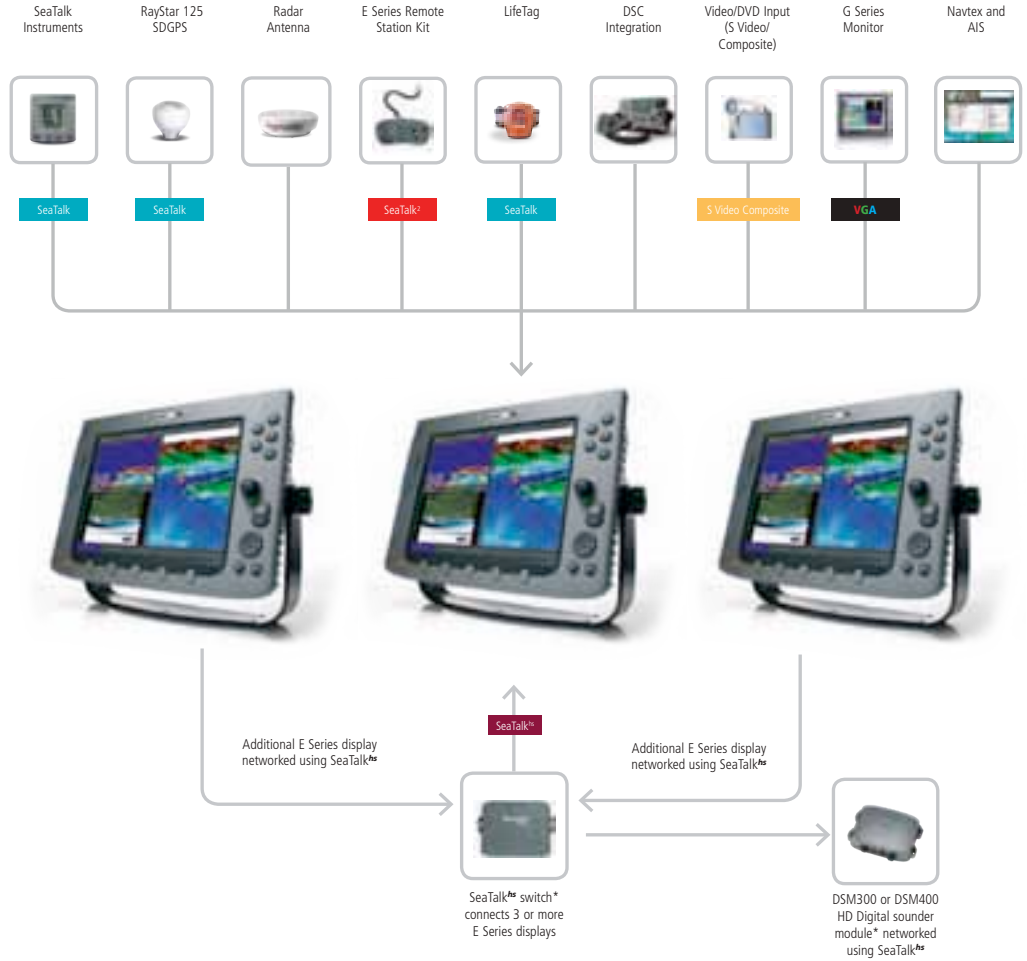
Video
- Video inputs (composite x4 or S-video x2) for viewing remote cameras or on board entertainment. Video input possibilities: underwater and docking cameras, engine room monitoring, DVD, gaming consoles and satellite TV.
- Video output port for connection to remote PC or flat screen monitors.
- CAM100 day and night vision camera.
- CAM50 colour video interior camera.

For more product information, visit our website **www.raymarine.co.uk**

GOTO page 90 for product specifications

E SERIES NETWORK CAPABILITIES

The following diagram illustrates the network capabilities of E Series. Install multiple displays around your vessel to display the information you need exactly where you want it.



GPS ANTENNA P35
HD DIGITAL FISHFINDER P38
RADAR ANTENNAS P32
VIDEO CAMERAS P44
INSTRUMENTATION P52

C SERIES WIDESCREEN MULTIFUNCTION DISPLAYS

The all new C Series Widescreen redefines multifunction navigation with larger, more brilliant displays, increased performance, expanded networking and video integration. Take control with a commanding view of multiple sources of information. Choose full screen navigation or choose multiple widescreen window combinations of chart, radar, fishfinder, video – C Series Widescreen gives you the flexibility and luxury of screen space to create the ideal configuration for every navigation scenario.

C Series Widescreen displays are available in 9", 12" or 14" screen sizes. The 9" C90W features 800 x 480 pixels (WVGA) resolution while the 12" C120W and 14" C140W are equipped with a super high resolution 1280 X 800 WXGA display. Each rugged display has a sunlight viewable screen which uses optical bonding technology for improved contrast, vibrant colours and a wide viewing angle.

New

C Series Widescreen displays can now be networked together (2 maximum) to share information.

Features

- Command view of multiple navigation sources on single widescreen display.
- Sunlight Viewable screen with Optical Bonding technology for improved viewing angle, colour and contrast in all lighting conditions.
- Super high resolution:
  C90W WVGA resolution 800 x 480 pixels.
  C120W WXGA resolution 1280 x 800 pixels.
  C140W WXGA resolution 1280 x 800 pixels.
- Internal high sensitivity GPS sensor.
- Preloaded with Navionics cartography.
- 3D and Satellite photo maps using optional Navionics Platinum charts.
- Intuitive UniControl™ pad streamlines activities and menu navigation.
- Dual display SeaTalk*hs* networking.
- Composite video input for on board cameras or entertainment.
- Digital, HD Digital and Super HD Digital radar support.
- Compatible with new 4kW 18" and 24" Digital radomes.
- Dual range radar when used with HD or Super HD open arrays.
- Connect to HD Digital Sounder Modules for digital fishfinding.
- SeaTalk, SeaTalk*ng*, NMEA 2000 and NMEA 0183 connectivity.
- Advanced SmartPilot X Series autopilot integration – activate the autopilot directly from the chartplotter.
- AIS target tracking in both chart and radar modes.

SeaTalk*hs*
High Speed Network

New
ROTATE 060°T
FWD
Heading
244°T
COG
238°T
SOG
6.4kt
Depth
50.5ft
XTE
401ft
Steer >
Ves Pos
61°05'.850N
146°34'.612W
True Wind
2.3°P
16.5kt
App. Wind
13.9°S
19.6kt
H-UP
RM
Sys
NAV
Chart Offset
FIND
CURSOR
GOTO...
ROUTES...
TRACKS...
PRESENTATION...
PAGE
WPTS MOB
OUT
RANGE
IN
ACTIVE
DATA
MENU
CANCEL

1. Chart Port
Install your Navionics Gold or Platinum charts stored on Compact Flash memory cards.

2. Soft Keys
Select corresponding functions identified by on-screen labels.

3. UniControl
Used to control on-screen cursor and scroll through menus.

4. GPS Sensor
Built-in high-sensitivity GPS sensor.

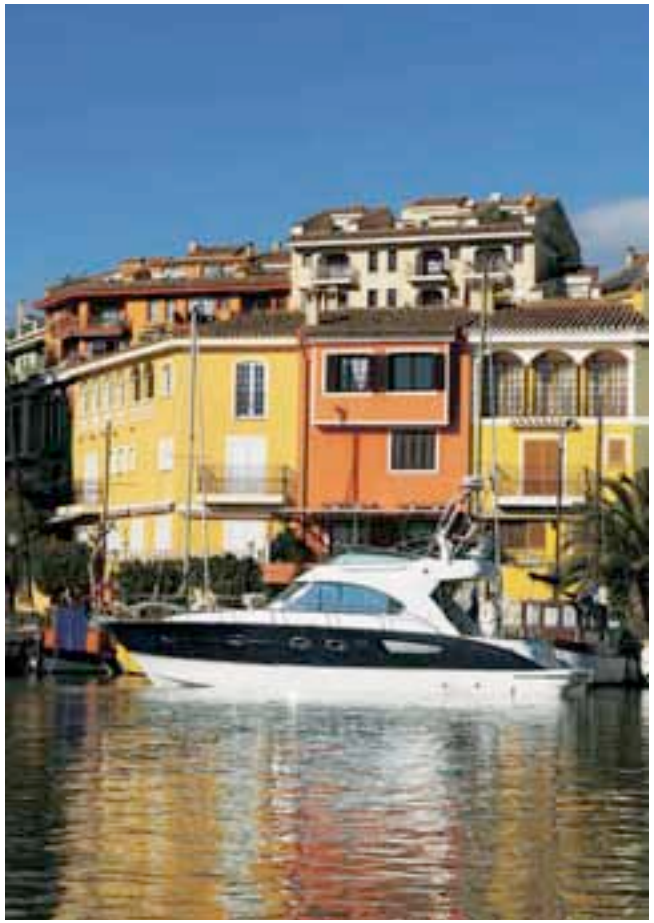
5. Dedicated Keys
Six keys with dedicated functions.

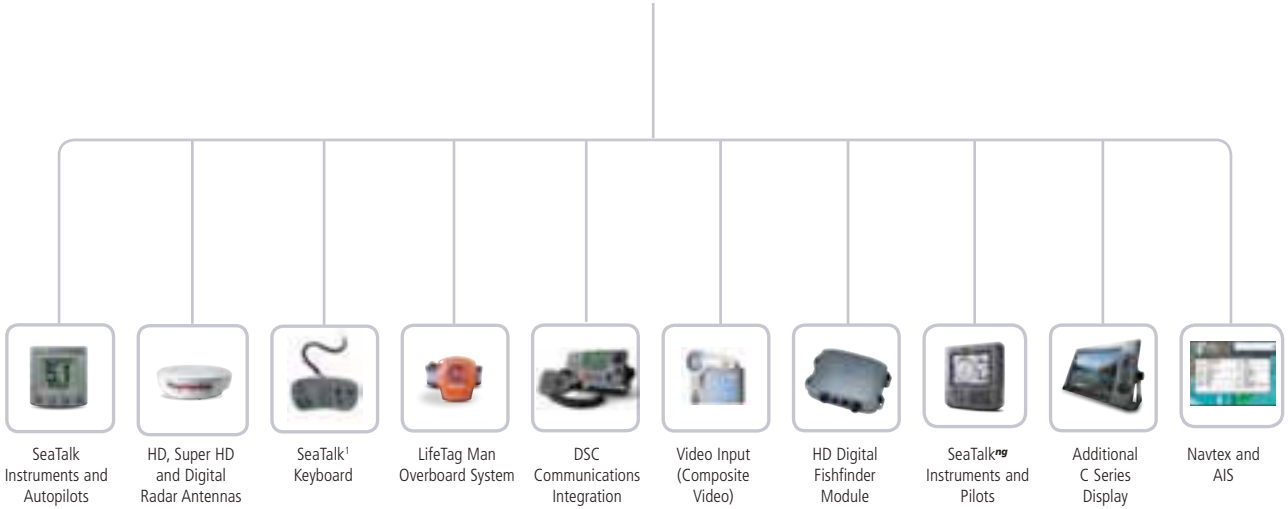
6. Range Key
Used to zoom the screen in and out in chart, radar and fishfinder modes and scale the screen in and out for chart and fishfinder modes.

Mounting Options
The C Series Widescreen displays can be flush mounted or trunnion mounted (optional trunnion kit sold separately).

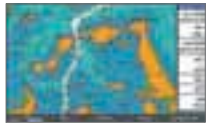
New

C90W (9") Widescreen Display. C120W (12") Widescreen Display. C140W (14") Widescreen Display.





COMPLETE NAVIGATION AND CONTROL



Intuitive

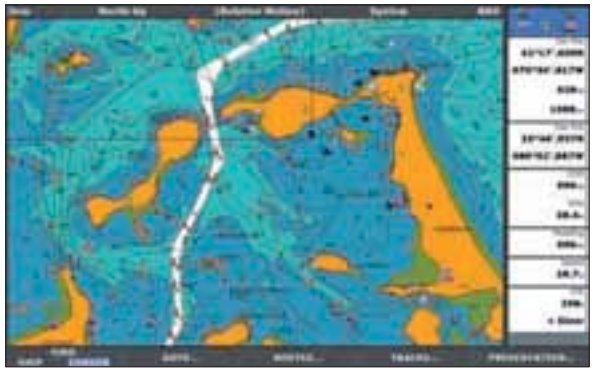
- The intuitive interface puts you in command. Simply 'page' through your choice of displays.
- Create custom windows of any combination of chartplotter, radar or sonar in your choice of layouts.
- Save your favourite trips – UniControl provides easy alphanumeric waypoint storage.
- Zoom x2, x3 or x4 and user-programmable zoom scales.

Multifunction

- Configure your C Series Widescreen display as a single function standalone chartplotter, digital fishfinder or radar or create a dual display widescreen network.
- Build a powerful all-in-one chartplotter/radar/fishfinder system.
- Use the NMEA 2000 interface to display virtual instrument data from electronic engine instruments to trim tab systems.
- AIS and Navtex data input support.

Advanced Display Technology

- View your screen in all conditions.
- Direct sunlight viewable 256 colour displays.
- Optical bonding technology for improved contrast, vibrant colour, wide viewing angle and the elimination of screen fogging.
- Prismatic light enhancing screens with integrated anti-glare filters.



HD DIGITAL

Current Graphics
Overlay current arrows on your charts.

Tide Graphics
Overlay tide indicators on your charts.

AIS Information
View AIS collision avoidance information when used with a compatible receiver.

Ready to Navigate with GPS and Charts
Each C Series Widescreen display is equipped with an internal high sensitivity GPS sensor. This high performance GPS sensor eliminates the need for an external GPS antenna for most installations.
C Series Widescreen displays are also pre-loaded with high quality ready-to-navigate Navionics charts or step up to 3D or Satellite photo charts using optional Navionics Platinum charts on Compact Flash. An on board graphics co-processor provides quick chart screen redraws and stunning 3D graphics.

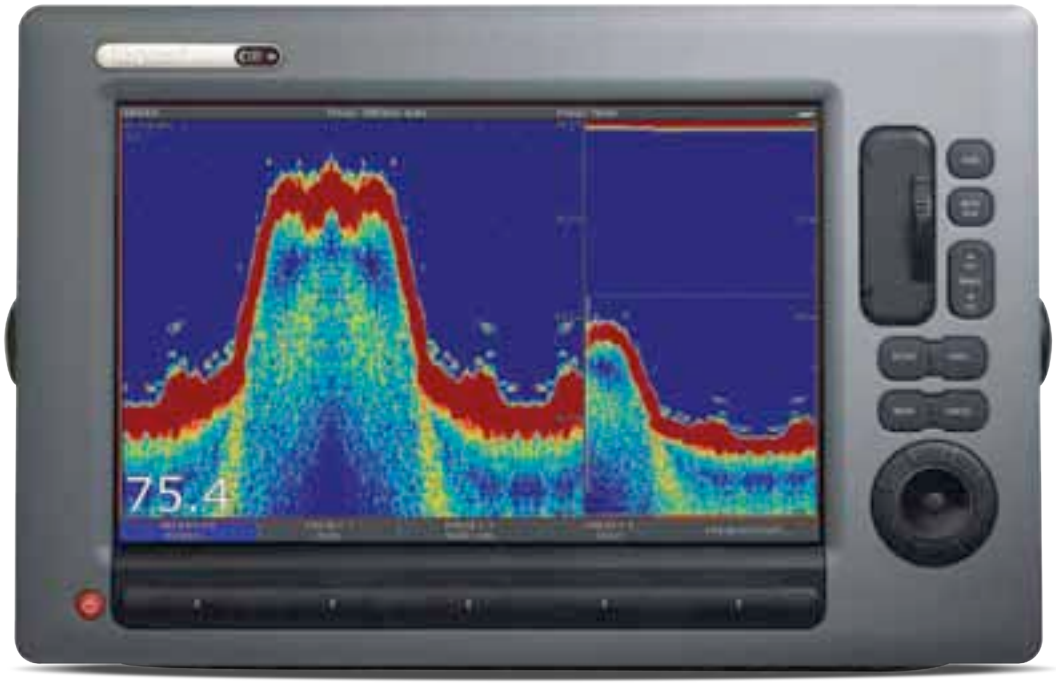
C Series Widescreen is compatible with the following Navionics charts on Compact Flash.

NAVIONICS Gold
NAVIONICS Gold+
NAVIONICS Platinum

Digital and HD Digital Radar Sensors
Expand the C Series Widescreen with Raymarine's unmatched digital radar technology. Choose the new powerful RD418D 18" radome with 4 kilowatts of output power and a narrow 4.9° horizontal beam width for enhanced target resolution. The new larger 4 kW RD424D 24" radome offers even better resolution with a 3.9° degree beam width. These highly advanced, space-saving new digital radomes are easy to install, thanks to a small diameter inter-unit cable for both power and SeaTalk^{hs} networking. For maximum radar performance choose the Raymarine HD or Super HD Digital radar pedestal with either a 4' or 6' open array. Raymarine's advanced HD Digital signal processing delivers lifelike target presentation that virtually eliminates noise and clutter. HD Digital technology enables advanced features such as Dual Range for a view of both long and short range scales in two radar windows on one screen. For the ultimate radar experience choose a Super HD Digital pedestal and open array with either a 4' or 6' array. Super HD Digital processing delivers a radar image that can't be matched by similar analogue or digital radar systems, and brings a level of performance that rivals systems of more than twice the physical size and power output.

Smart Heading Sensor
For the best radar overlay and MARPA performance, choose the gyro enhanced Smart Heading Sensor or connect to an SPX autopilot.

GOTO page 92 for product specifications



HD DIGITAL

HD Digital Sounder Modules

Experience Raymarine's patented HD Digital Fishfinder technology by adding a Digital Sonar Module to your C Series Widescreen network. Raymarine's HD Digital sounder technology delivers true hands-off operation thanks to an adaptive digital transmitter/receiver that automatically adjusts up to 220 sonar parameters per second. Coastal anglers can choose the DSM30 with dual frequency 200/50 kHz operation and 600 watts of power. The DSM300 offers the same dual frequency capability plus the offshore ready output power of 600/1000 watts (dependent on the transducer used).

Video Integration

Each C Series Widescreen display features a video input for an onboard camera. Raymarine Marine Cameras are plug-and-play and offer outstanding video quality and durability in the marine environment.

Build your C Series Widescreen Network

Build a system with single widescreen display or plug two C Series Widescreen displays together to create a dual display C Series Widescreen network – expand the system with SeaTalk*hs* digital network sensors for radar and fishfinder.

Alternatively, a SeaTalk*hs* 8 port network switch can be added for easy installation of all SeaTalk*hs* sensors. C Series Widescreen displays also feature a SeaTalk*ng* data bus port for connecting to SeaTalk*ng* compatible instruments, autopilots, and NMEA2000 compatible devices. The NMEA2000 interface enables any C Series Widescreen to display virtual instrument data from electronic engine instruments to trim tab systems. Two NMEA0183 in/out ports are available for AIS and third party devices. A first generation SeaTalk port is also available for networking with an external GPS sensor, LifeTag and first generation SeaTalk compatible instruments and autopilots.

SPX Autopilots

Using SeaTalk*ng* C Series Widescreen and SPX autopilots go beyond conventional chartplotter-autopilot communication. C Series Widescreen displays can be used to control autopilot functions from the chartplotter interface. An autopilot dialogue enables the skipper to engage and disengage the autopilot directly from the C Series display offering added convenience when using Raymarine's SPX pilots for waypoint and route navigation.

HD DIGITAL FISHFINDER P38
RADAR ANTENNAS P32
LIFETAG P42
AIS P44
INSTRUMENTS P52
VIDEO CAMERAS P44
AUTOPILOTS P66

C SERIES SINGLE-STATION DISPLAYS

The C Series range consists of three models – different sizes to fit every dashboard that are capable of showing radar, chart and fishfinder information on a single sunlight viewable screen. View information full screen or in custom windows with multiple sources of vital information visible simultaneously.

C Series is easy to use with its on screen menus and dedicated function keys. Additional 'Twist 'n' Click', range and track pad controls make zooming, chart panning, waypoint naming, scrolling menus and feature selection quick and easy to accomplish.

Features

- Navtex weather data input and AIS data input support.
- Engine monitoring support for NMEA 2000 and J1939 compatible engines (view graphical trim tab, engine tilt, generator data and trip average fuel rate).
- Customisable instrument and data screens, including compass rose and sea temperature graph.
- Plan your journey at home with RayTech software (see page 50) and then transfer your plan to C Series using a Compact Flash memory card.
- See tide and currents with dynamic tide and current overlays and animation.
- View the intuitive compass bar display across the top of your screen.
- Display range rings on your chart to see how far objects are from your vessel.
- Full support for Navionics Silver, Gold and Gold Plus cartography on Compact Flash.
- Distances less than 1/4 nm displayed in metres or feet, depending on unit selection.
- Additional system integration when used with a Raymarine autopilot... engage pilot directly from your C Series display.

Note: Engine monitoring enhancements require connection to NMEA 2000-compatible components.

GOTO page 93 for product specifications

NAVIONICS Gold NAVIONICS Gold+ NAVIONICS Silver

The C Series range consists of three models C70 (6.5"), C80 (8.4") and C120 (12.1") LCD displays.

Chartplotting

Connect the optional Raystar125 SDGPS Sensor and add Navionics Gold charts to transform any C Series display into an accurate and detailed GPS charting system.

- Support for professional quality Navionics Gold vector charts on Compact Flash cards.
- 256 colour high-resolution display and Navionics Gold 'paper chart' like clarity.
- True and relative motion modes.
- Auto range mode intelligently maintains your vessel and your waypoint on the best chart scale while underway.
- Quick and easy alphanumeric waypoint storage using the 'Twist 'n' Click' rotary control.
- On-screen VHF DSC position reports (with compatible DSC VHF via NMEA).
- Unlimited waypoint, route and track storage using Compact Flash cards.

Radar

Add an optional non-digital radar scanner (radome or open array) to create a powerful radar system.

- Overlay radar information onto the chart screen with the radar/chart overlay feature.
- MARPA (Mini-Automatic-Radar-Plotting-Aid) target tracking (requires smart heading sensor).
- Waypoint navigation and multiple waypoint overlay.
- Low receiver noise figure (< 5dB).
- Auto GST™ fully automatic gain, sea clutter and tune control for real 'hands-off' operation.
- Advanced microprocessor controlled transmitter-receiver features 8 pulse width/PRF settings, providing enhanced target returns through every range scale.

HD Digital Fishfinder

Transform your C Series display into the ultimate fishfinder by adding a Raymarine HD Digital fishfinder module.

- Raymarine HD Digital fishfinders produce dramatically clearer images than traditional fishfinders.
- HD Digital targets are more precise and the result is that you'll reveal more fish, see individual fish and even distinguish bait fish from larger species.
- HD Digital technology automatically adjusts to changing water and seabed conditions to ensure you get the clearest picture.

HD AND SUPER HD DIGITAL SCANNERS = UNRIVALLED PERFORMANCE

Raymarine's new Super HD Digital and HD Digital radar technology - not just a step but a true leap into the future.

The HD Digital secret is Digital Signal Processing, delivering the performance and target recovery in a Super HD Digital 4kW package to rival that produced in a conventional analogue 12kW radar and in a 12kW package, that of a conventional 25kW radar.

Not only have our R&D teams leapt a technological barrier in target detection, the fruits of their labour mean that this superior performance can be enjoyed using only a quarter, or even less, of the power consumption that a conventional 25kW radar would demand.

Truly revolutionary, Raymarine HD Digital technology improves target detection by 100% Digital Signal Processing compared to analogue processing in other radars, extracting more information from the radar echo return than has ever been generally available to the leisure navigator before. Super HD Digital adds another level of Digital Signal Processing to further enhance the performance and improve the resolution. Stunning multi-level 256 colour target displays provide extra clarity and detail; for example, stronger targets show as different colours so that ships that could be lost in rain clutter now stand out in a completely different colour.

A perfect match for the G Series navigation system, these new open arrays will also fit an E Series system and the new C Series Widescreen displays for the very latest in radar technology – HD and Super HD Digital.

HD and Super HD Digital Features

- Real time dual-range radar.
- HD Digital technology delivers superior processing and target detection.
- Multi-level colour target display.
- Adaptive auto settings.
- Coastal, Harbour, Offshore and Buoy auto modes.
- SeaTalk^{hs} network compatible.
- New, thin radar interconnect assembly – quicker installation.
- Simple install, no need to open pedestal (external waterproof connector).
- 10.8 to 32V DC operation with supplied external voltage converter.
- Field upgradable software via Compact Flash card in GPM400, E Series or C Series Widescreen.
- HD Digital Radar technology maximizes digital radar receiver performance, enabling 4kW Raymarine HD Digital radars to deliver target detection that rival much larger and more powerful analogue radar systems.
- Raymarine HD Digital technology improves target detection by using 100% Digital Signal Processing and information extraction.
- HD Digital and Super HD Digital radar technology delivers substantial improvements in range and bearing resolution.

Note: Actual maximum radar range will vary depending on scanner and target height. Visit **www.raymarine.co.uk** to learn more about maximum radar ranges.

New

Raymarine's scanners deliver unparalleled performance. The compact 4kW radomes provide range scales of 24nm (18") and 48nm (24") while the high performance open arrays offer 72nm maximum range and improved target resolution*.

Open array or radome?

Choose a **radome** when mounting space is limited or restricted by rigging.

Radomes are ideal for sailboats and powerboats and provide exceptional performance even in the most challenging conditions.

Choose an **open array** scanner for enhanced performance and range. These larger scanners are equipped with a more efficient antenna (increased gain) and narrow beam widths for improved performance and target separation. HD Digital and Super HD Digital radar technology and open array scanners deliver substantial improvements in range and bearing resolution.

Open array scanners are ideal for powerboats, commercial vessels and larger sailing vessels that demand maximum performance.

Radomes

- Choice of 2kW (18") or 4kW (24") models.
- Improved radiation pattern and bearing resolution using Propagation Enhancing Geometry.
- Improved sensitivity, signal to noise ratio and lower overall receive noise.
- Greatly reduced sea clutter.
- Improved target separation and clarity at short ranges.
- Increased target visibility at long ranges.
- Lightweight and compact.
- Ideal when space is at a premium.
- Minimal power consumption.
- Plug and play with C and E Series multifunction displays.

Digital Radomes

- Choice of powerful 4kW 18" or 24" models.
- Narrow beam width for enhanced target resolution (4.9º 18" Radome and 3.9º for 24" Radome).
- Compatible with C Series Widescreen, E Series and G Series. Not compatible with C Series.
- SeaTalk*hs* connectivity.
- Superior sensitivity and weak target detection.
- Optimised performance over complete range scale relative to range discrimination and target detection.

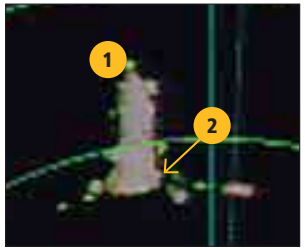
GOTO page 95 for product specifications

Real World Image

Ocean linear and yacht leaving harbour.

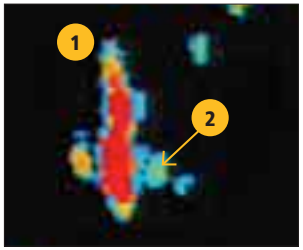
Standard Commercial Radar

Standard commercial 25 kW radar. Yacht (2) echo merges with ocean liner (1) echo.



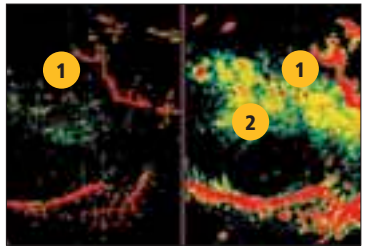
HD Digital Radar Image

Raymarine HD Digital 4 kW radar Yacht (2) is clearly visible as a green echo next to the liner (1).



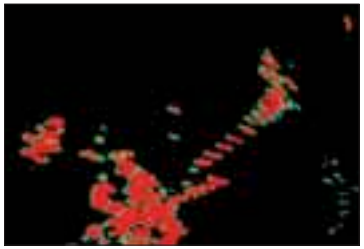
HD Digital All Weather Performance

Raymarine Super HD and HD Digital radar provide superior all weather performance. Targets (1) still visible through rain (2).



Super HD Digital 4kW radar Image

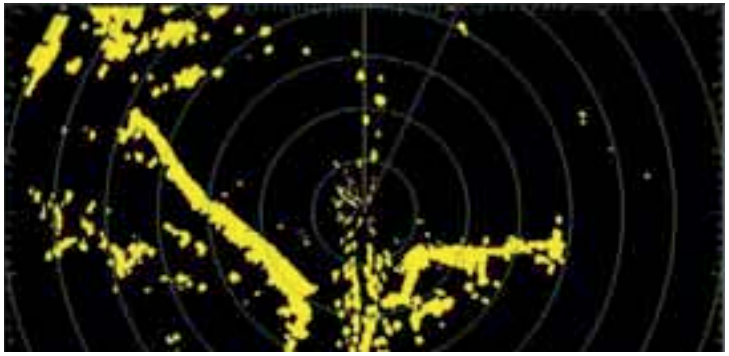
Raymarine Super HD accurately identifies small targets.



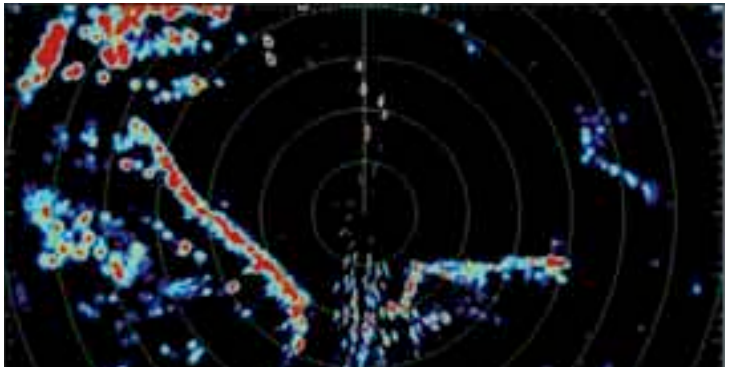
Analogue 12kW radar Image

Analogue radar offers less detailed images.

Classic Radar image



HD DIGITAL

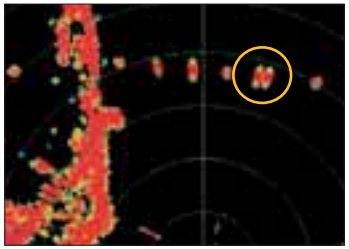


HD Digital radar extracts more information. Targets that merge with standard radar displays can be identified more clearly with HD Digital. For example, vessels at low tide close to mud banks would merge with standard radar, whereas HD Digital can separate them for a clearer picture – targets with different frequencies are 'tagged' with different colour for clarity.

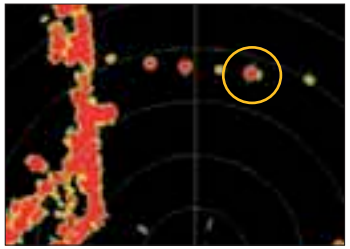
Super HD Digital Radar compared to HD Digital

Super HD reveals even more detail than HD Digital. The Super HD image shows that there are actually two targets in the ringed area, whereas the same targets on HD image appear as one.

Super HD Digital



HD Digital



18" 2kW AND 24" 4kW RADOMES

RADOME PRODUCT FEATURES	18"	24"
Power – kW (kilowatts)	2	4
Maximum range scale – nautical miles (nm)	24	48
Weight – lb (kg)	19.9 (9)	22.1 (10)

18" AND 24" 4kW DIGITAL RADOMES

New

RADOME PRODUCT FEATURES	18"	24"
Power – kW (kilowatts)	4	4
Maximum range scale – nautical miles (nm)	48	48
Weight – lb (kg)	21 (9.5)	22.1 (10)

48" AND 72" 4kW HD DIGITAL OPEN ARRAYS

4 kW OPEN ARRAY PRODUCT FEATURES	48"	72"
Power – kW (kilowatts)	4	4
Maximum range scale – nautical miles (nm)	72	72
Weight – lb (kg)	57.2 (26)	63.8 (29)

48" AND 72" 4kW AND 12kW SUPER HD DIGITAL OPEN ARRAYS

4 AND 12 kW OPEN ARRAY PRODUCT FEATURES	48"	72"
Power – kW (kilowatts)	4 or 12	4 or 12
Maximum range scale – nautical miles (nm)	72	72
Pedestal weight – lb (kg)	57.2 (26)	63.8 (29)

RAYSTAR 125 COMPACT SATELLITE DIFFERENTIAL GPS ANTENNA

Compact and accurate the Raystar125 Satellite Differential GPS receiver provides pinpoint accuracy to Raymarine's C Series and E Series multifunction displays. The Raystar125 outputs either SeaTalk or NMEA 0183 and is fully compatible with Raymarine SeaTalk instruments and autopilots.

A self contained waterproof GPS receiver and antenna combined, the Raystar125 delivers accuracy to less than 3 metres by decoding GPS correction signals.

SATELLITE TV ANTENNA SYSTEMS

Nobody buys a boat so they can watch TV. But there are times when even the most sociable and adventurous of us wants nothing more than a quiet night in with a movie (or possibly a loud night in with the football).

Raymarine's Satellite TV antennas bring the same combination of high performance and ease-of-use to your onboard entertainment that you have come to expect from our instruments.

Housed in a compact dome, our antenna systems automatically track and receive satellite TV signals in almost any conditions – guaranteed quick, clear, reliable access to hundreds of digital channels.

They're easy to fit and operate with simple cabling, an intuitive control unit and the reassurance of Raymarine's worldwide service and support network.

Better technology - better reception

Unique Wide Range Search (WRS) technology means Raymarine's antennas can identify and acquire satellite signals as quickly as possible. When you've got a fix on the satellite signal you want, the tracking algorithms will help ensure you keep it.

They're built to cope with tough conditions, too. Dynamic Beam Tilting (DBT) continuously measures, and compensates for your vessel's heading, pitch and roll – keeping your antenna locked on a satellite and ensuring a clear picture, whatever the weather or waves are doing.

GOTO page 98 for product specifications

60STV

The high-performance 60STV extends the range of satellite coverage and offers enhanced satellite tracking in regions prone to weaker satellite signals. The powerful 60STV satellite antenna system is designed for larger vessels 15m (50') and over. Available in Standard and Premium models, it offers all the advantages of the 45STV, plus a few more:

- Automated Skew Control (Premium models only): ensures maximum signal strength while under way by optimising the LNB skew position.

45STV: Dual LNB Multiple Satellite Receivers

The perfect blend of size and performance, the 45STV makes satellite television at sea a reality for 12m – 15m (40' – 60') vessels.

37STV: Compact, Light-Weight and Easy to Install

The 37STV delivers maximum performance in a small footprint. The space saving 37STV system is designed for smaller vessels between 6.4m – 12.3m (25' – 40').

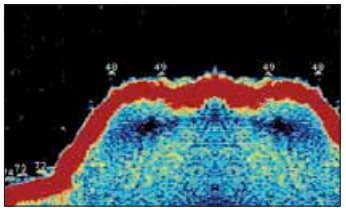
At just 37cm (14.5") diameter, the antenna can be installed in tight locations.

Antenna Control Unit

- Provides power to the antenna.
- Displays antenna status.
- Contains diagnostic indicators.
- Enables manual satellite selection.
- Connects to PCs for easy upgrades.

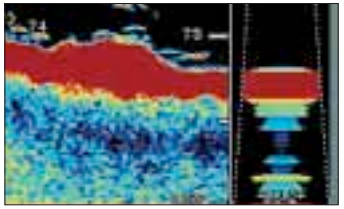
FEATURES	37STV	45STV	60STV	60STV P'RM
Dual or Quad LNB design for multiple receivers	Dual	Dual	Quad	Quad
DVB (Digital Video Broadcast) compatible	●	●	●	●
Dome diameter	37cm	45cm	60cm	60cm
Wide Range Search Algorithm for high speed search and fast satellite aquisition	●	●	●	●
Dynamic Beam Tilting (DBT) technology signal tracking in extreme weather and sea conditions	●	●	●	●
High Definition (HD) compatible	●	●	●	●
Enhanced signal reception and improved antenna gain for improved performance in poor weather			●	●
NMEA 0183 GPS position input capability for reduced acquisition time	●		●	●
Conical scanning detects strongest satellite signal for enhanced stabilisation	●	●	●	●
Wide elevation angles to maintain satellite fix			●	●
Rotating sub-reflector redirects signal for reduced dish movement and quieter operation	●	●	●	●

Targets are identified individually so you can pick out big fish from bait fish.



HD Digital enables you to view the sea bed clearly and in great detail.

HD Digital eliminates surface clutter for superior performance.



See fish echoes and bottom returns in real time with the A Scope feature.

x2, x4 or x6 zoom for enlarged view of targets.

HD DIGITAL FISH IMAGING

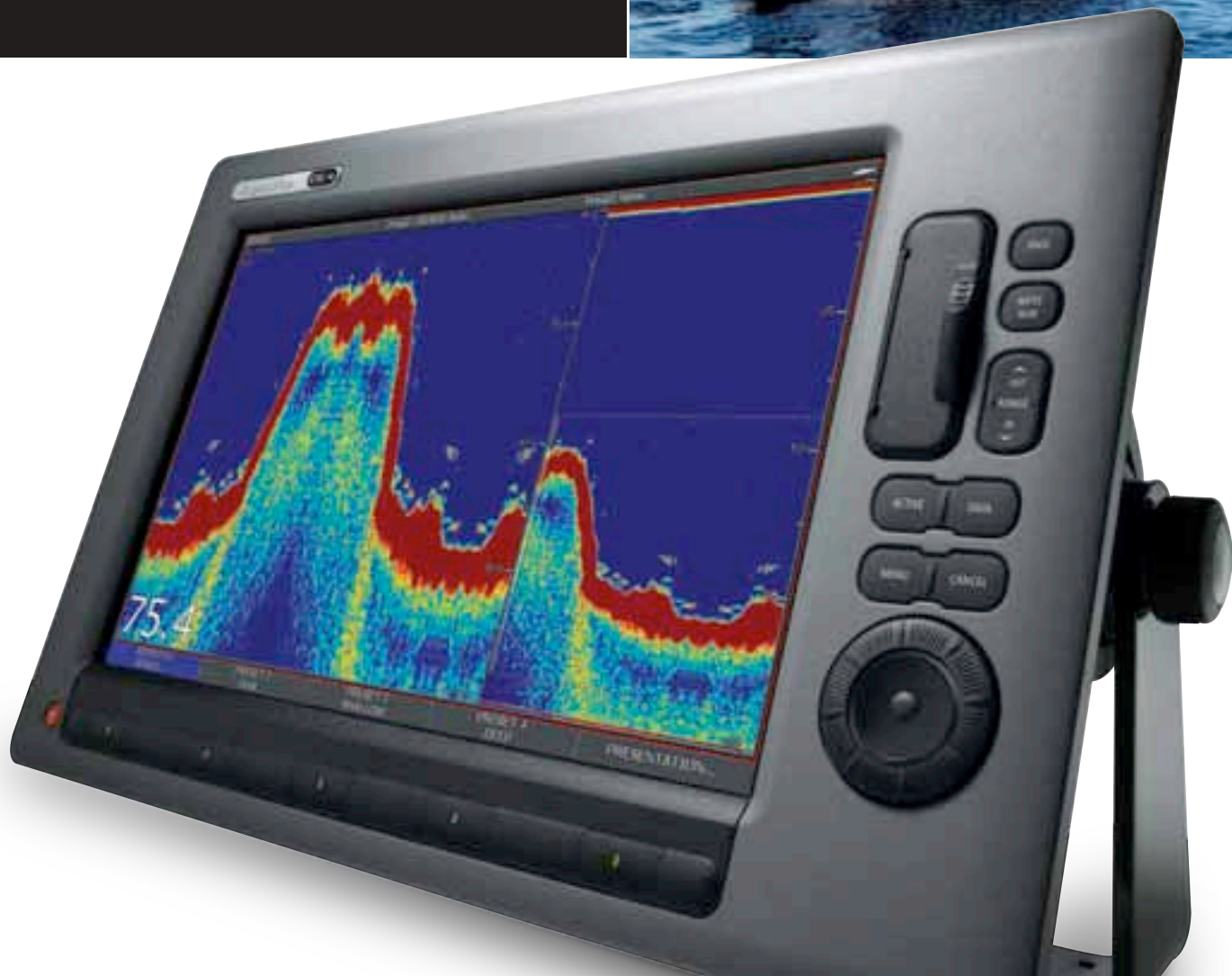
Being able to see what's underwater can mean the difference between a productive fishing or diving trip and a wasted day.

The HD Digital advantage
- All Raymarine fishfinders feature Raymarine HD Digital Sonar technology.
- Digital 'adaptive' fishfinding automatically adjusts to changing water and seabed conditions.
- Pictures are dramatically clearer.

See clearly
- HD Digital produces precise target echoes revealing more fish targets – conventional fishfinders produce less well defined echoes.
- Auto Adaptive transmitter/receiver.
- Infinite number of receiver bandwidths.
- Accurately distinguish bait fish from larger species.
- Precisely target fish and see individual fish that ordinary fishfinders cannot.

No hassle
- Maximum fish echoes and bottom discrimination in all conditions.
- HD Digital receiver out-performs ordinary fishfinders in shallow and deep water; at high speeds and in choppy seas.
- Auto Adaptive control of: sensitivity; ping rate; transmit power; receiver bandwidth.
- Fully automatic 'hands-off' operation.

No clutter
- HD Digital eliminates surface clutter. Fixed bandwidth fishfinders exhibit surface clutter from turbulence and their own transmit signal.
- Shallow water or offshore, HD Digital targets fish accurately at all depths.



DSM30/300 Dual or DSM400 multiple frequency

For top performance in both shallow and deep water, powerful dual or multiple frequencies conveniently allow you to choose your frequency manually or use the auto frequency function. You can choose to display one frequency in easy-to-read full screen mode or view up to 4 multiple frequencies (dependent on transducer setup) simultaneously in split screen mode.

A-scope and bottom coverage

See fish and the seabed in real time – A-scope technology instantaneously displays the echoes found in the transducer's acoustic beam. Using the patented bottom coverage feature, you can easily see the size of the area of seabed being covered by the transducer cone.

Bottom lock

Bottom lock has the unique ability to smooth out the seabed presentation and is extremely useful if you are looking for fish that live close to the ocean floor. It gives greater magnification of fish echo returns directly above the seabed, helping you differentiate structure from fish.

Zoom

Use the auto zoom to help you find fish and their habitat close to the bottom, or select manual zoom for a detailed view of fish closer to the surface. Pinpoint fish echoes with x2, x4 and x6 zoom magnification.

SINGLE STATION SYSTEM

1. 4kW Digital Radome Scanner
2. Raystar125 SDGPS Antenna
3. E Series Multifunction Network Display
4. HD Digital Sounder Module
5. Transducer

Combine the Digital Sounder Module with a multifunction display to create an 'all-in-one' integrated fishfinder/radar/chartplotter display.

NETWORK SYSTEM

1. RayTech RNS 6.1 Navigation Software
2. 4kW Digital Radome Scanner
3. Raystar125 SDGPS Antenna
4. E Series Multifunction Display
5. SeaTalk Navigation Keyboard
6. E Series Multifunction Display
7. SeaTalk Switch
8. HD Digital Sounder Module
9. Transducer

The Digital Sounder Module adds HD Digital echo sounder technology to every display in the navigation network.

G SERIES NETWORK SYSTEM

1. RayTech RNS 6.1 Navigation Software
2. HD Digital or Super HD Open Array
3. Raystar125 SDGPS Antenna
4. G Series Monitor
5. G Series Monitor
6. G Series Keyboard
7. GPM400 Processor
8. DSM400 HD Digital Fishfinder Module
9. Broadband Transducers

The Digital Sounder Module adds HD Digital echo sounder technology to every display in the navigation network.

DSM30 HD DIGITAL FISHFINDER MODULE

The DSM30 is a 600 Watt Digital Sounder Module with HD Digital technology. This 'black box' digital fishfinder provides fishfinder capabilities to Raymarine C Series, C Series Widescreen and E Series displays.

DSM300 HD DIGITAL FISHFINDER MODULE

Whether you are a commercial fisherman, running a sport-fishing venture, diving school or involved in survey work, (or just love fishing), the latest technical developments from Raymarine will help you. The DSM300 is a Digital Sounder Module with HD Digital technology. This 'black box' digital fishfinder provides full function fishfinder capabilities to Raymarine G Series, E Series, C Series and C Series Widescreen displays.

DSM400 HD DIGITAL FISHFINDER MODULE

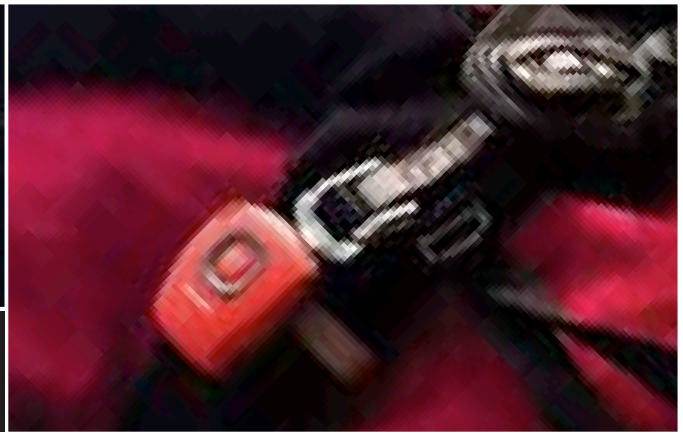
Built to complement the new G Series, the DSM400 is Raymarine's next generation HD Digital sounder processor. Extra powerful, extra flexible – using up to 3kW of penetrating power, the DSM400 uses new broadband technology transducers for multiple operating frequencies – 28, 38, 50 185 and 200kHz.

	HD DIGITAL FISHFINDER MODULES		
FEATURES	**DSM30**	**DSM300**	**DSM400**
Power output (power dependent on transducer used)	600 Watts	600 or 1000 Watts	1, 2, or 3kW
Dual frequency 200/50kHz operation	●	●	
Multiple operation frequencies – 28, 38, 50, 185 and 200kHz			●
4 independent transceivers allowing 2 dual frequency transducers to see 4 different sonar images			●
Operating voltage	12V	12 or 24V	12 or 24V
Infinite number of automatic receiver bandwidths for adapting to all types of sea and bottom conditions	●	●	●
HD Digital receiver technology provides Auto Adaptive control of Sensitivity, Ping rate and Transmit Power	●	●	●
Compatible with ultra high-performance transducers, including broad bandwidth and widebeam			●
Compatible with C Series multifunction single station displays	●	●	
Compatible with C Series Widescreen multifunction network displays	●	●	
Compatible with E Series multifunction network displays	●	●	●
Compatible with G Series premier navigation system		●	●

TRANSDUCERS AND ACCESSORIES

For information on the complete range, compatibility information, detailed specifications and installation instructions for Raymarine fishfinder transducers, visit our website **www.raymarine.co.uk**

GOTO page 99 for product specifications



LIFETAG MAN OVERBOARD SYSTEM

LifeTag is a personal man overboard (MOB) system that consists of a base station and wireless tags worn by crew members, family or pets. LifeTag can be used as a standalone system or integrated into a Raymarine SeaTalk network.

How does it work in standalone configuration?
If a crew member falls overboard, or strays out of range – typically 9m (30') – contact with the base-station is lost and a loud alarm sounds.

How does it work in a SeaTalk network?
If you have a Raymarine SeaTalk network equipped with Raymarine multifunction displays or ST60+ or ST290 instruments, an emergency waypoint (999) is created with co-ordinates relating to the point at which the alarm was activated. A bearing to waypoint '999' is displayed (in addition to the audible alarm) so that you can navigate back to the position at which contact with the LifeTag was lost.

Man Overboard Situation
In the event of a man overboard situation, Raymarine multifunction displays connected to a LifeTag system will display the position at which the signal was lost and the alarm raised. The display will also show the bearing from your vessel's current position back to the position at which the signal was lost, thereby increasing your chances of a successful recovery.

GOTO page 96 for product specifications

What's in the box...
The basic LifeTag system consists of the following items: Base Station, External Alarm and 2 LifeTags.

LifeTag Features

- Basic system includes 2 LifeTags and a base station.
- System can be expanded (extra LifeTags sold separately) to monitor up to 16 LifeTags. Larger boats may be covered by additional base stations.
- Supplied velcro strap enables LifeTag to be fitted around the wrist of an adult or child, to an article of clothing, belt loop or a pet's collar.
- LED for status feedback.
- Replaceable CR2 Lithium batteries (supplied) – expected battery life is one year (with over 2000 operational hours).
- Tags will power off automatically, whilst remaining fully operational.

LifeTag Base Station Features

- Handles communication with each LifeTag.
- Outputs for external alarm siren.
- Secondary output for activating other systems.
- 12V DC power or can be powered by the SeaTalk network.

LifeTag Alarm

- Extra loud alarm sound.
- Simple two wire connection to base station.

LifeTag System Warning:

The Raymarine LifeTag system is only an aid to crew safety, and is an enhancement only of a vessel's main crew safety system. It is the responsibility of the captain and all crew members to ensure that all safety instructions and procedures are in place and obeyed with local requirements. Failure to operate this system in accordance with the operating instructions may result in unreliable or reduced system performance.

G SERIES

P10

E SERIES

P16

C SERIES WIDESCREEN

P22

In the event of a man overboard situation, Raymarine multi-function displays connected to a LifeTag system will display the position at which the signal was lost and the alarm raised.

MARINE CAMERAS

CAM100

The CAM100 is a day and night camera that transforms Raymarine E and G Series into powerful onboard video observation systems, recommended for exterior applications. Improve docking safety by monitoring blind spots or keep track of the crew and an eye on the engine room from the helm. From the flybridge to saloon, monitor any activity, or use multiple cameras for a total view of your vessels surroundings. The camera uses a highly sensitive IR sensor to switch from true colour to black and white night vision mode.

Reverse Image Cameras
Choose the CAM100 with Reverse Image for aft deck or engine room applications. CAM50 for engine room applications.

Features:
- Plug and play with Raymarine E Series, G Series and C Series Widescreen.
- Automatic switching between true colour (day) and black and white (night).
- Automatic IR LED on/off with photo sensor.
- Excellent colour reproduction.
- Up to 15m (49') total darkness visibility in night mode (black and white).
- Clear-focus at night with anti distortion technology.

CAM50

The ideal camera for interior installations. Unobtrusive dome design is ideal for mounting in the saloon, wheel house or engine room.

Features:
- Available in normal view or choose the CAM50 reverse image version.
- Plug and play with Raymarine E Series and G Series.
- Ceiling or wall mount.
- Adjustable field of view.
- High quality imager.
- Excellent colour reproduction.

GOTO page 91 for product specifications

AIS250 RECEIVER AND AIS500 TRANSCEIVER

AUTOMATIC IDENTIFICATION SYSTEM (AIS)

Operating in the VHF maritime band, the AIS system enables the wireless exchange of navigation status between vessels and shore-side traffic monitoring centres. Commercial ships, ocean-going vessels and recreational boats equipped with AIS transmitters broadcast AIS messages that include the vessel's name, course, speed and current navigation status.

AIS250 RECEIVER MODULE

The Raymarine AIS250 Receiver module is a 'listen only' dual-channel AIS receiver that easily integrates with Raymarine multifunction systems, allowing AIS targets to be overlaid graphically in both the chartplotter and radar modes.

Features

- Switched dual channel, multiplexed system – a single receiver uses sophisticated software to monitor AIS Class A and B transmissions over standard VHF frequencies.
- Overlay AIS targets on Raymarine multifunction displays in both chartplotter and radar modes.
- AIS target tracking enhances your situational awareness by monitoring a target's name, course, speed and navigation status.
- Reconcile AIS targets with radar targets for added safety.
- Built-in VHF/FM antenna splitter. No additional antenna required.
- Two NMEA 0183 input and two NMEA 0183 output ports with a built-in multiplexer for easy installation.

System Requirements

- VHF Antenna.
- Chartplotter, multifunction display or PC application with NMEA 0183 input and AIS compatibility.
- Raymarine multifunction display requirements:
  C Series software version 4.29.
  E Series software version 4.29 or higher.

AIS500 TRANSCEIVER

The AIS500 is a class B AIS transceiver allowing you to receive and transmit AIS navigation status information between vessels and shore-based traffic centres. The AIS500 networks with Raymarine multifunction systems using SeaTalk*ng* technology. An on board VHF splitter simplifies installation and dedicated GPS sensor ensures accurate position data when broadcasting your vessels' position.

Features

- Class B AIS receive and transmit.
- Dual channel (multiplexed) AIS monitoring ability – vessel monitoring of class A and B transmissions.
- Built-in NMEA multiplexer enables multiple NMEA 0183 connections to the single NMEA input and output ports on Raymarine displays.
- VHF splitter permits sharing of a single antenna with radio and AIS.
- Includes external GPS antenna.
- SeaTalk*ng* networking – compatible with Raymarine E and G Series displays.
- NMEA 0183 compatibility with Raymarine A, C, E and G Series and other manufacturers capable of displaying AIS targets.
- Buddy tracking – distinguish favourite targets (MMSIs) from others by adding to favourites list.
- Silent mode allows you to turn off the transmit function if you do not wish to be seen during races or at your favourite fishing spot.
- Easy Installation and configuration.

New

AIS250 AIS500

Radar Overlay
Overlay AIS targets radar contacts on Raymarine multifunction navigation displays.

GOTO page 90 for product specifications

NEW A SERIES CHARTPLOTTERS & CHARTPLOTTER/FISHFINDERS

New A Series… chartplotter or chartplotter/fishfinder, the choice is yours

Harness the power of Raymarine's advanced engineering and exclusive technologies with the new A Series displays. With A Series you can navigate like a pro using high resolution 2D or 3D* and aerial photo charts. You can target fish with unprecedented clarity using Raymarine's unmatched HD Digital sonar technology.

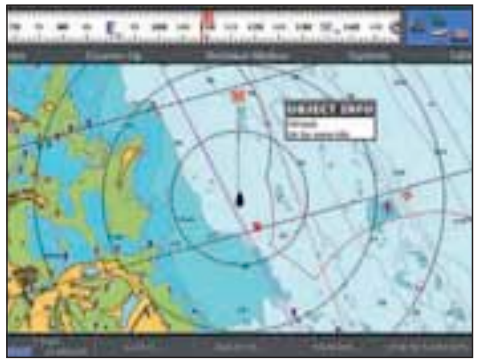
CHART COVERAGE

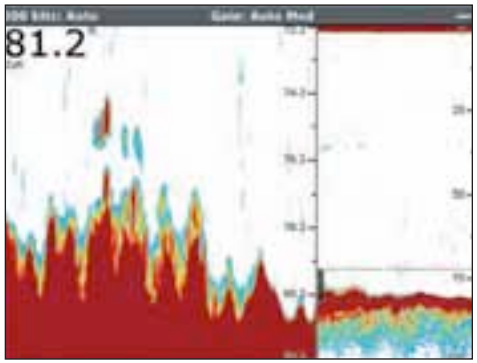
93S Embedded European cartography.
94S Embedded Rest of the World cartography.

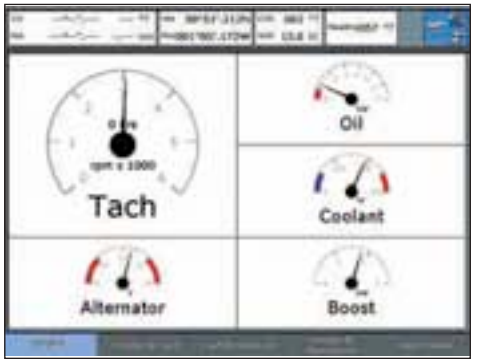
- Built-in GPS antenna.
- Built-in Navionics cartography.
- Built-in HD Digital fishfinder module*.
- Built-in cable management system.
- Engine monitoring.

* A Series A50D, A57D and A70D modules.

GOTO page 101 for product specifications







Powerful Chartplotting
A Series chartplotters are available pre-loaded with Navionics charts that cover entire regions of Europe, US or the Rest of the World **. These charts offer familiar paper-like cartography that's clear and easy to read at all zoom levels, user selectable safety contours and object information.

For even greater chart detail and features, upgrade to the optional Navionics Gold or Platinum charts.

Chart upgrade features include:
- 3D and aerial photo chart navigation using optional Navionics Platinum.

** Pre-installed Navionics cartography excludes Greenland and Iceland, Finnish and Russian Lakes, EU and Russian inland waterways. Rest of the World cartography excludes the coast of China.

HD Digital™ Fishfinder
A Series chartplotter/fishfinders offer superior fish detection and bottom discrimination using Raymarine's unmatched HD Digital sonar technology. The HD Digital Fishfinder built into the A50D, A57D and A70D instantly adapts to changing seabed and water conditions providing fully automatic hands-off operation.

- P58 transom mount depth, speed and temperature transducer included. Ideal for small inboard / outboard boats.
- Dual frequency 200/50 kHz (dual frequency transducer required).
- Auto Adaptive control of sensitivity, ping rate and transmit power.

Engine Monitoring
Connect with NMEA2000 compatible engine instruments and trim tabs using Raymarine SeaTalk*ng* next generation data bus.

AIS Target Tracking
Transform any A Series chartplotter into an AIS (Automatic Identification System) display using the optional AIS250 receiver.

CABLE MANAGEMENT

Cable management system keeps cables neat, tidy and out of sight.

Quick release swivel mount bracket can be easily fitted and quickly removed for security.

P58 TRANSDUCER

The A Series fishfinder version includes the plastic P58 tri-ducer.

A Series Display Line Up

	A50	A50D	A57D	A70	A70D
A Series LCD Display Size – mm (in)	127mm (5")	127mm (5")	144mm (5.7")	162mm (6.4")	162mm (6.4")
GPS / Chartplotter	•	•	•	•	•
HD Digital Fishfinder		•	•		•

A50 & A50D

Chartplotter only or Chartplotter and Fishfinder with 127mm (5") sunlight viewable LCD display.

A57D

Chartplotter/Fishfinder with 144mm (5.7") sunlight viewable LCD display.

A70 & A70D

Chartplotter only or Chartplotter and Fishfinder with 162mm (6.4") sunlight viewable LCD display.

ULTRA WIDE FANBEAM TRANSDUCER OPTION

Engineered for shallow water coastal, lake and river fishing, the unique FanBeam transducer delivers an extra wide view of the bottom. In addition to a very wide beam the FanBeam can be rotated fore and aft or port and starboard with an easy-to-use rotary beam control built right into the top of the transducer housing. The FanBeam transducer is designed for transom or trolling motor mounting and features a built in temperature sensor.

- 3x the beam width of conventional 200 kHz transducers.
- Unique beam rotation control built into the transducer housing.
- 200 kHz frequency for fishing up to 300 feet of water.
- Elliptical wide beam is 38° x 12° degrees wide at -3dB (maximum measured power).
- The FanBeam transducer is available as an option for all A Series Chartplotter/Fishfinders.

Beam rotated fore and aft

Beam rotated port and starboard

GOTO page 101 for product specifications

RAYTECH NAVIGATION SOFTWARE

Serious about sailing? Raymarine's RayTech RNS 6.1 is a powerful and flexible software package that can be used for route planning, performance analysis, fishing charters, weather forecasting, tactics... a multitude of uses.

Try it for yourself – a 'light' version of RayTech RNS 6.1 is available **FREE** as a download from **www.raymarine.co.uk**

Quick to do, easy to use, you will be able to plan your routes, add in waypoints on your PC at home and then transfer the data to your onboard Raymarine displays. Once you get to like it, give yourself the advantage and go for the full version of RayTech RNS 6.1.

Features

- Advanced PC navigation suite.
- Support for vector, raster, 3D bathemetric and aerial photo cartography.
- Take your PC onboard and access radar, digital fishfinder, charts and navigation data instantly with Raymarine E Series and G Series displays*.
- SeaTalk*hs* networking through your PCs ethernet port.
- Plan waypoints and routes, then transfer them between your PC, Raymarine chartplotters and multifunction displays.
- Built-in worldwide tides and currents database.
- Integration with G Series navigation systems.
- Raymarine HD Digital radar support.
- Raymarine DSM400 HD Digital Sounder Module support.
- AIS target tracking.
- Compatible with all Navionics® format charts on compact flash (except Navionics Classic).
- Compatible with Maptech® BSB v2.0-v4.0 Raster Charts, Softchart Raster Charts, NDI Raster Charts and NOAA Raster Navigation charts (RNC).

Minimum System Requirements

- Intel Pentium 4 or faster processor.
- 512MB RAM.
- Dedicated graphics card.
- Microsoft Windows XP/Vista*.
- CD-ROM Drive.
- Serial port for networking via SeaTalk or NMEA 0183.
- Ethernet port for SeaTalk*hs* networking.
- USB 1.0/2.0 for connecting Navionics or C-MAP card reader.
- 16 bit colour monitor (1024 x 768 resolution).

Microsoft Windows Vista. When installed on a PC with MS Windows Vista, RayTech RNS 6.1 supports route planning and GPS navigation through serial interfaces (NMEA 0183 or SeaTalk) only. RayTech SeaTalk*hs* (Ethernet) networking is not supported on MS Windows Vista. Visit www.raymarine.com/raytech to learn more.

* Networking to SeaTalk*hs* compatible multi function displays is only compatible with MS Windows XP.

GOTO page 97 for product specifications

18.2
15.8
53.6
283°

ST70 – A SINGLE DISPLAY WITH MULTIPLE TALENTS

ST70 offers a brand new way of visualising instrumentation and autopilot control via a single high-resolution colour display.

Designed for simple setup and extensive user customisation, ST70 offers an array of intuitive digital, analogue, graphical and historical display options. Next generation ST70 systems are built on Raymarine's new SeaTalk***ng*** network architecture.

The SeaTalk***ng*** network enables even easier interconnection of multiple ST70 instruments, transducers and NMEA 2000 compatible devices. ST70 also integrates with existing Raymarine SeaTalk and SeaTalk^2 systems.

General Features

- 8 user defined instrument data pages.
- 16 screen layout options available for each data page.
- Each page can be customised and turned on/off as you require.
- Start-up wizard helps you to automatically configure each ST70 display in the system.
- Ten languages available: UK English, US English, Spanish, French, German, Dutch, Italian, Swedish, Danish and Norwegian.
- Easy-to-use carousel menu makes setup easy.
- Sunlight viewable TFT colour display.
- 89mm (3.5") 320 x 240 pixel resolution (QVGA).
- High contrast display.
- Day and Night mode colour palettes.
- Fully waterproof to IPX6 standard.
- Stylish low-profile flush mount or surface mount with supplied adaptor.
- Same footprint as ST60+ instruments.
- Can easily be retrofitted to ST60 surface mount installations with A22113 panel adaptor.

ST70 Autopilot Control Head

Standard ST70 Instrument Head

GOTO page 102 for product specifications

SPEED

The speed section displays the following information.

- VMG (Velocity made good) to Waypoint and VMG to Waypoint Log.
- Speed and Speed Log.
- Maximum Speed and Average Speed.
- VMG Windward.
- Log and Trip.
- Race Time, Local Time and Local Date.
- Stopwatch.

DEPTH

Display single pages of depth information or customise your ST70 to display multiple windows.

- Depth (feet, fathoms or metres).
- Depth log.
- Minimum depth.
- Maximum depth.

COMPASS

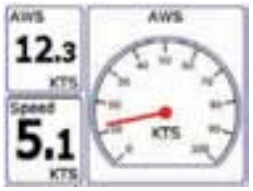
- Heading.
- Heading log.
- Locked heading.
- Tack heading.
- CMG (Course made good).
- DMG (Distance made good).
- Average course error.
- Average heading.

WIND

- Apparent wind speed and apparent wind angle.
- True wind speed and true wind angle.
- GWD (Ground Wind Direction).
- Beaufort scale.
- Cardinal.
- Wind speed log and wind direction log.
- Minimum / maximum apparent wind speed.
- Minimum and maximum true wind speed.

ENGINE DATA

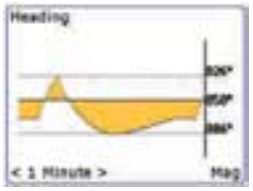
- Engine RPM.
- Fuel flow and fuel level.
- Battery voltage and battery voltage log.
- Battery Amps and temperature.
- Engine hours.
- Trim position.
- Oil pressure and oil temperature.
- Coolant temperature and pressure.
- Boost pressure.



Average wind speed (day mode)

Boat Speed (day mode)

Analogue Heading (day mode)



Heading Log (day mode)

Depth (day mode)

Multi Data Display (day mode)

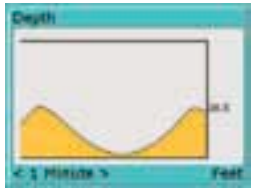
Apparent Wind Angle (day mode)

Average Wind Speed (night mode)

Wind Multi Screen (night mode)

Digital Heading (night mode)

Average Wind Speed (night mode)



Depth Log (night mode)

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ENVIRONMENTAL DATA

- Sea temperature.
- Barometric pressure and barometric pressure log.
- Sunrise and sunset.
- Sea temperature (minimum and maximum).
- Air temperature and air temperature log.
- Air temperature (minimum and maximum).

AUTOPILOT CONTROL

- Start-up wizard configures the autopilot.
- Compatible with SPX and existing ST1 course computers.
- Choose from digital display, compass rose or 3D isometric screens.
- Can display a further 3 instrument data boxes.
- Multilingual.
- New simplified set-up and calibration.
- Fits in standard ST6002 or ST60+ footprint.
- Surface or flush mount.
- Power on/off switch.
- Can be used as a master display or a colour repeater to an existing system.
- Intuitive dodge function – when connected to an SPX range course computer.
- Extensive fishing patterns – when connected to an SPX range course computer.

TRANSDUCERS

ST70 uses the same transducers as the ST60 range of instruments. However, SeaTalk*ng* transducer pods are required to link the transducers to the ST70 network. Transducers and pods are sold separately.

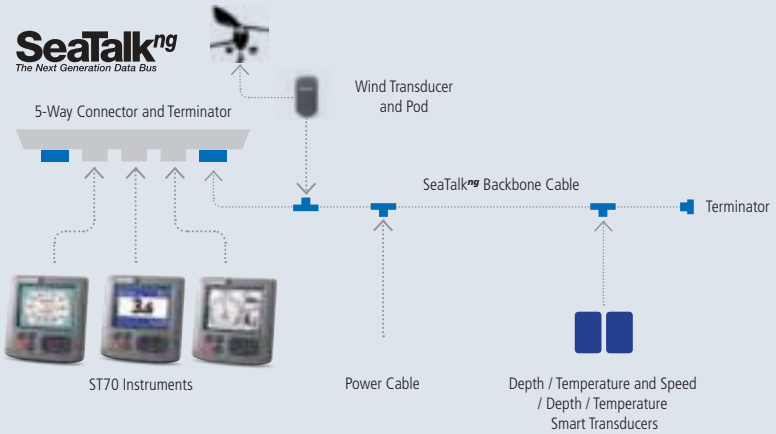
Compatible with existing ST60 transducers (when used with an ST70 transducer pod) and new SmartTransducers.

Smart Transducers
The DST800 and DT800 Smart Transducers are supplied with SeaTalk*ng* cables and connect directly into the SeaTalk*ng* backbone, simplifying the installation and negating the need for a pod. The DST800 combines depth, speed and temperature transducers within the same 50mm housing. DT800 provides depth and temperature. Depth ceramic is set at 12 degrees.

TechTip

SmartController
Take full, on-board control of your Raymarine SeaTalk instruments with the wireless SmartController. Wireless operation means freedom to monitor vital information when on deck or out of sight of your instruments.

Integration
- Add colour to your ST60 system with an ST70 instrument.
- Each ST70 unit is supplied with a first generation SeaTalk adaptor cable for plug and play connectivity with ST60/ ST60 Plus instruments.
- ST70 intelligently converts first-generation SeaTalk data to SeaTalk*ng*.



ST70 PLUS – FOR THE BIGGER PICTURE

The ST70 Plus instrument display is designed primarily for sail and powerboats over 12m (40') and is the perfect partner for Raymarine multifunction display systems. The large, high visibility, 164mm (6.5") LCDs are ideal for installations where information is viewed at a distance, perhaps mounted on the mast or on a large bridge, or you simply want to view information in a large format at close range at the navigation station or helm.

Like the smaller ST70 instrument display, ST70 Plus is fully customisable, allowing you to view information when you want it and where you want it, be it in digital or analogue format, full screen or in user defined windows selected from any of 17 configurations.

The button-less displays are operated by dedicated keypads – there's a push-button only pilot keypad for sailboats, a rotary pilot for powerboats and a combination push button and rotary instrument keypad for complete control of all instrument features.

New

Red backlighting mode

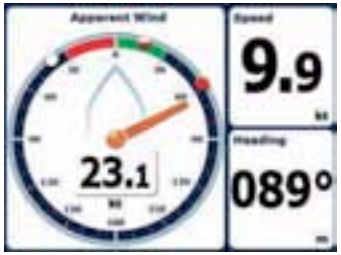
ST70 Plus displays are operated using dedicated keypads

White on black backlighting mode

Combination digital and analogue configuration

Full screen analogue display

White backlighting mode



General Features

- Large 6.5" (164mm) VGA colour LCD display.
- Wide viewing angle for superb visibility.
- Sunlight viewable display.
- 4:3 Screen format (640 x 480 pixels).
- SeaTalk*ng* connectivity.
- Installation options include surface mount, flush mount or rear panel mounting.
- Choice of backlighting – red, white. Inverse text option with white text on a black background.
- Fully waterproof to IPX6 standard.
- High quality graphics.
- User defined instrument data pages.
- 17 screen template/layout options.
- Each page can be customised and turned on/off as required.
- Language options. English (UK); English (US); French; German; Danish; Dutch; Spanish; Italian; Norwegian; Finnish; Swiss; Swedish; Portuguese; Russian; Chinese; Japanese; Korean and Greek.
- Screen can be configured as an instrument or an autopilot display (at set-up).
- Intuitive operating menu and functionality with large bright icons.

ST70 PLUS FUNCTIONS SUMMARY

SPEED

The speed section displays the following information.

- Velocity Made Good to Waypoint.
- Speed and Speed Over Ground.
- Maximum Speed and Average Speed.
- VMG Windward.
- Trolling speed.

DEPTH

Display single pages of depth information or customise your ST70 Plus to display multiple windows.

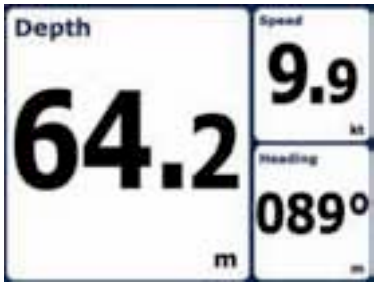
- Depth (feet, fathoms or metres).
- Depth log.
- Minimum depth.
- Maximum depth.

WIND

- Apparent wind speed and wind angle.
- True wind speed and true wind angle.
- GWD (Ground Wind Direction).
- Cardinal.
- Beaufort scale.
- Wind speed log and wind direction log.
- Minimum / maximum apparent wind speed.
- Minimum / maximum true wind speed.
- Minimum / maximum Apparent wind angle.
- Minimum / maximum True wind angle.

Full screen digital with white backlight

Full screen digital with white backlight



Optional colour background

Menu with red backlight

Typical menu screen

New

ST70 PLUS FUNCTION SUMMARY CONTINUED...

ENGINE
- Engine RPM.
- Fuel flow.
- Battery amps.
- Engine hours.
- Trim position.
- Oil pressure and temperature.
- Coolant temperature.
- Boost pressure.
- Coolant pressure.
- Display of Bennetts and Lenco trim tab position.

ENVIRONMENTAL
- Sea temperature.
- Barometric pressure.
- Sunrise and sunset.
- Sea temperature (min and max).
- Air temperature.
- Air temperature (min and max).
- Set and drift.
- Dew point.
- Wind chill (true and apparent).
- Humidity.

FUEL
- Fuel level.
- Fuel flow – instantaneous.
- Fuel flow – average.
- Distance to empty.
- Fuel economy.

BATTERY
- Battery voltage.
- Battery AMPs.
- Voltage (of the unit).
- Battery temperature.

NAVIGATION
- Course Made Good (CMG).
- Distance Made Good (DMG).
- Bearing and Distance to Waypoint (BTW and DTW).
- Cross Track Error (XTE).
- Estimated Time of Arrival and Time To Go (ETA and TTG).

GPS
- Course Over Ground (COG).
- Speed Over Ground (SOG).
- Latitude and Longitude (Lat/Lon).
- Satellites.
- Satellites and horizontal dilution of precision (HDOP).

DISTANCE AND TIME
- Log and trip.
- Local time.
- Local time and date.
- Race timers.

PILOT MODE
- Rudder angle.
- Course to steer.
- Pilot heading.

HEADING
- Heading.
- Locked heading.
- Tack heading.

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Note: For a full list of ST70 Plus functions and features, please visit our website **www.raymarine.co.uk** or **www.raymarine.eu**

INSTRUMENT KEYPAD
The instrument keypad controls all the instrument functions via a series of push buttons and a multifunction 'Unicontrol' interface.

POWER PILOT KEYPAD
The power pilot keypad is designed specifically for powerboats. Dedicated buttons are used to engage and disengage the pilot whilst the 'Unicontrol' allows you change course. Dodge also available on the power keypad – needs an SPX pilot to activate.

SAIL PILOT KEYPAD
Designed for sail boats, the sail pilot keypad consists of dedicated buttons to engage and disengage the autopilot, perform a dodge manoeuvre and track to a waypoint. Course adjustments are made using the port and starboard -1, +1, -10 and +10 keys.

New

Intuitive graphic menu system for ease of use and setup.

SeaTalk^{ng} compact connectors enable quick yet secure networking.

SeaTalk^{ng} Next Generation Data Bus

Copyright Classic Boat Magazine

ST60+ – INSTRUMENTS OF CHOICE WORLDWIDE

ST60+ offers everything from stand-alone display units to sophisticated, fully-integrated systems. Significantly enhanced displays ensure superior viewing angles for both day and night conditions. Simple, push-button controls make ST60+ instruments extremely easy to use.

Features

- Bezels to match multifunction displays.
- Speed over ground (SOG) now available on Speed and Tridata.
- Automatic switching of depth sensors when used with depth sounder modules to eliminate interference.
- 'Soft' power down.

"We want to have, at our fingertips, the same information and data that the top yachts and navigators are using. Our Tactical Information commentary from the water includes true and apparent wind speed and direction, derived tidal and current information, depth, boat speed and accurate positioning data. Motoring alongside yachts, I can use the Raymarine equipment to report the exact conditions yachts are encountering, including the apparent and true wind, velocity made good and distance to the next mark."

Dick Johnson – Cowes Week Radio

ST60+ GRAPHIC

- Displays all ST60+ data on SeaTalk with easy-to-read graphics and multi-line formats.
- Up to 7 configurable 'favourites' pages with single, dual, triple or quad data formats.
- Speed, depth, wind, heading, navigate, autopilot, environment and favourite chapters.
- NMEA in and out and external alarm drive.

ST60+ TRIDATA

Combines depth and speed data in an easy-to-read 3-line display. Dedicated depth and speed displays with trip/log, sea temperature and SOG.

ST60+ SPEED

Displays speed through water, speed over ground (GPS required), sea surface temperature, trip and log data.

ST60+ DEPTH

- Easy-view large digits plus depth trend indicator.
- Min/max depth.
- Audible shallow, anchor and deep water alarms.

GO10 page 104 for product specifications

G SERIES

P10

E SERIES

P16

C SERIES WIDESCREEN

P22

ST60+ COMPASS

Dedicated easy-to-read analogue/ digital display with patented fluxgate transducer.

ST60+ WIND

- Combines analogue and digital measurements.
- Calculates both apparent and true (relative) wind speed/direction (true wind requires SeaTalk speed through water data).

ST60+ RUDDER

ST60+ analogue rudder display available with rudder transducer or used as a repeater for a Raymarine SeaTalk autopilot.

ST60+ CH WIND

Magnified 20° – 60° display for when a single degree can make all the difference.

WIND TRANSDUCERS

Raymarine wind transducers offer low start-up speeds, smooth operation and great accuracy. There are two designs to choose from: aluminium short arm or carbon fibre long arm.

Wind Transducer Features

- 1° directional accuracy.
- Low start-up speed (<1 knot).
- Solid pin locking mechanism.
- Quality low friction bearings.
- 30m or 50m cable lengths.
- Fits into existing older style block.

CLUBHOUSE WIND

"On Shore" version of the ST60+ wind system. Wind speed and direction displayed within an easy-to-read compass rose.

FLUSH MOUNT

ST60+ Speed shown with the optional flush-mount bezel.

REAR PANEL MOUNT

Install instruments neatly behind a bulkhead with the rear panel mounting kit.

DASH TOP

For dash top installations, use the trunnion mounting kit.

TRANSDUCERS

Plastic self-sealing speed and depth transducers supplied as standard.

CABLES

SeaTalk cables are available in 1m (3') to 20m (60') lengths.

TechTip

SmartController. Take control of your Raymarine SeaTalk instruments and autopilots with the wireless SmartController. Wireless operation means freedom to monitor vital information when on deck or out of sight of your instruments.

GOTO page 104 for product specifications

ST40 – THE BEST THINGS COME IN SMALL PACKAGES

Big displays for smaller powerboats, yachts and RIBs, these powerful SeaTalk instruments offer full integration with Raymarine autopilots and navigation equipment and can be surface or trunnion mounted.

Extra large (28mm max) digits and razor sharp LCDs – easy-to-use ST40 instruments have outstanding visibility in all lighting conditions.

ST40 Compass
Displays current compass heading plus locked heading, has 'off course' alarms and can be used as a 'Man Over Board' repeater.

ST40 Depth
Crystal clear depth readout. Shallow and deep anchor alarms and minimum depth display.

ST40 Wind
Apparent wind speed and direction and true wind speed and direction. Talks to your autopilot to steer your boat to a saved apparent wind angle.

ST40 Speed
Shows current, maximum and average boat speed, log, trip and sea temperature.

ST40 Bidata
Speed, depth, log and sea temperature. Two sets of data at once in large or small digits.

ST40 Rotavector wind transducer supplied with the wind system.

GOTO page 105 for product specifications

ST290 – BIG BOLD SCREENS FOR MAXIMUM VISIBILITY

Combining big, bold, user-friendly displays with intelligent transducers, ST290 uses superfast SeaTalk^2 technology to create a comprehensive information network.

Navigation, heading, autopilot and environmental data plus depth, speed and wind – ST290 has been engineered for simplicity and ease of use. Displays and controls can be flush-mounted into dashes or bulkheads and a surface mount option is also available. The advanced design makes calibration easy.

For serious performance data and comparisons, you can integrate the system with your PC using the RayTech SailRacer software interface (excluding E Series).

Features

- Bezels to match multifunction displays.
- Big, clear displays.
- Comprehensive range of digital and analogue displays, plus separate keypads.
- Easy-to-install, set up and use.
- More accurate data – advanced transducers and calibration.
- CAN Bus (SeaTalk^2) – faster and with more data capacity.
- NMEA 2000 compatible.
- System flexibility – small or large systems.
- 2-way PC communication via RayTech PC software.
- Clean styling with low profile, flush-mount displays.

ST290 GRAPHIC

The ST290 Graphic controls and displays every available information source. For maximum visibility, the large dot-matrix LCD has easy-to-read graphics in giant or multi-line formats. Intuitive menus and simple 'Chapter and Page' control keys give quick and easy access to graphs, diagrams or numeric displays. The convenient 'Favourites' chapter makes it easy to set the information in the order you want to see it.

ST290 DATA

The ideal repeater solution, the ST290 Data is one of the largest dual line displays available and features an intelligent scrolling 'Favourites' chapter for vital information. 'Chapter and Page' keys provide access to all information across the ST290 network.

GOTO page 106 for product specifications

ST290 ANALOGUE WIND & CLOSE HAULED WIND

Displays precise analogue wind direction with a digital readout of wind speed or VMG. The close hauled wind display magnifies wind direction between 20° and 60°.

ST290 RUDDER ANGLE DISPLAY

Shows the position of the rudder and complements ST290 systems with integrated autopilots.

ST290 ANALOGUE COMPASS

Displays heading and course over ground (GPS input required) and average heading data.

MOB (MAN OVERBOARD KEYPAD)

Activates Man Overboard function on Raymarine navigation aids.

ST290 REMOTE KEYPAD

Gives complete remote control of ST290 Graphic and Data displays.

ST290 PILOT KEYPAD

The easy-to-use, ST290 Pilot Keypad with 1° and 10° degree course change buttons gives complete autopilot control. A complete ST290 Autopilot system needs an ST290 DPU, a Graphic display and a Smartpilot Series core pack and drive unit.

DATA PROCESSING UNIT (DPU)

Delivering advanced rapid data calculations, the intelligent and powerful DPU is the easy connection point and can be used for other equipment as well as PC connectivity.

Integrated autopilot display & control. Use the dedicated pilot chapters on both the ST290 graphic and data displays and combine with an ST290 pilot keypad for full autopilot control.

GOTO page 106 for product specifications

Windy

AUTOHELM AUTOPILOTS: YOUR EXTRA CREW MEMBER

It's a beautiful day, the sun's out and you fancy a break. Let the autopilot take the strain while you relax with a drink.

Or, if the wind whips up, just hit the button while you shorten sail or head below to check everything's secure – even when it's blowing a gale, the waves are 30' high, and you're racing hundreds of miles from land…

From a basic tiller pilot to a powerful inboard system, each Raymarine autopilot comes with a simple, intuitive keypad and clear, functional LCD display.

So what is an Autopilot?
An autopilot connects to your steering system and continually corrects your boat's heading with information supplied by the compass, wind transducers or GPS/Plotter.

Autopilots are designed to maintain an accurate course in various sea conditions with minimal helm movements. They can act as a spare pair of hands or an extra crew member allowing you to trim the sails or get the fenders over the side. Because they steer so accurately, they will save fuel and get you to your destination faster, especially when connected to a chartplotter.

Autopilots consist of three main components: a heading sensor (usually a compass), a processor and drive controller (the brains), and a drive mechanism (the business end).

Autopilot Types
There are two types of autopilot, above deck and Inboard (also called below decks). Above deck pilots are simple to install and remain in the cockpit in all types of weather. Inboard autopilots are permanently mounted below decks and are more powerful, more reliable, steer your boat better and can be supplied with a range of autopilot controllers.

Raymarine autopilots work so well that it's sometimes easy to forget that they can't see – they can't automatically avoid obstacles or other vessels. Always keep a vigilant watch.

Raymarine SPX autopilots – the smart choice
From a tiller pilot and a wheel-mounted Sportdrive to a full inboard system, Raymarine SPX autopilots are powerful but simple to use with clear, easy-to-read LCD displays.

X-tra – accurate steering.
X-tra – accurate tracking.
X-tra – energy efficient.
X-tra – fuel efficient.
X-tra – easy to install and service.

G SERIES

P10

E SERIES

P16

C SERIES WIDESCREEN

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HD DIGITAL FISHFINDER

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INSTRUMENTATION

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SPX-5 WHEEL DRIVE PILOT FOR SAILBOATS

The SPX-5 wheel pilot comprises a fully enclosed wheel-drive for simple installation and superb autopilot performance. Mount the separate control unit where it is easy to reach and see. The course computer and fluxgate compass are mounted separately for optimum performance.

The LCD shows the pilot status and repeats up to 15 pages of user-defined navigation data from any SeaTalk system.

The rugged wheel-drive unit is available as an upgrade for existing ST4000 systems.

Features

- Quick and easy installation.
- Fits most types of wheel.
- Independent display for 'best location'.
- Simple robust clutch engagement mechanism.
- Clean design.
- Smart Rudder Sense™ (SRS) enabled – Rudder Reference Transducer not required.

Display Head Options

The SPX-5 Wheel Pilot is supplied with the ST6002 Control Head. However, additional controls (ST7002 and ST8002) are available for second station installations as well as wireless remote controls.

Installation

We recommend that you consult a Raymarine approved dealer who can specify, install and commission the correct Raymarine system for your boat.
An approved installation also carries our full worldwide 2 year warranty.

The SPX-5 course computer, the 'brains' of the Wheel-Drive Pilot.

Rudder reference transducer not required, but offwind performance can be enhanced on performance yachts with the addition of a rudder reference transducer.

	Recommended Maximum Displacement*
SPX-5 Wheel Pilot	7,500kg (16,500 lbs)

*Remember, always take the fully laden displacement weight of your vessel into account, this is often 20% above the designed displacement, so don't be tempted to choose a pilot which will always be working at the limits of its design capabilities. If you choose your pilot with safety in mind, it won't struggle when the going gets tough.

GOTO page 109 for product specifications

SPX Autopilots. Easy to install and service, fuel efficient, energy efficient, accurate tracking and accurate steering.

SMARTPILOT SPX

SPX-5 SPORT DRIVE PILOT

The SPX-5 Sport Wheel Drive Pilot is a helm mounted autopilot designed for use on small sports and fishing boats typically up to 9.2m (30') in length. Suitable for use with fixed and tilt helms, the pilot consists of a drive unit that fits over your existing steering wheel shaft, a course computer with a rate gyro for precise course keeping and control head with large LCD information display.

Operation couldn't be simpler… steer onto your desired course, press the large red AUTO button and let go of the wheel! It really is that simple. To disengage the pilot and regain manual control, grab hold of the wheel and press the STANDBY button, you now have control. When part of a SeaTalk navigation system, the Sport Drive can track to single waypoints or follow a route consisting of multiple waypoints.

Weights

- Mechanical steered boats – up to 4,400lbs.
- Hydraulic steered boats – up to 7,000lbs.

Features

- Install the drive unit directly on to your existing steering wheel.
- Smart Rudder Sense™ (SRS) enabled - Rudder Reference Transducer not required.
- Easy to install and simple to calibrate thanks to the intelligent Autolearn software that automatically learns your boat's handling characteristics.
- Rate gyro built into the course computer ensures precise course keeping.
- Ideal for trolling speed applications.
- Control Head can be surface or flush mounted (requires optional flush mount kit) so its easy to see and reach.
- ST6002 Control Head displays pilot status and up to 15 pages of user-defined navigation data when part of a SeaTalk system.
- Autopilot controls are intuitive and display clear information courtesy of the high-contrast LCD.

The SPX-5 course computer, the 'brains' of the Wheel Drive Pilot.

GOTO page 109 for product specifications

Sport Drive Selection Chart

	Displacement up to 4400 lbs	Displacement up to 7000 lbs	Typical Boat Length
RIBs (Mechanical)	●		Up to 7.7m (25ft)
RIBs (Hydraulic)		●	Up to 9.0m (30ft)
Outboard (Mechanical)	●		Up to 7.7m (25ft)
Outboard (Hydraulic)		●	Up to 9.0m (30ft)
Power Assisted		●	Up to 10.7m (35ft)

Mechanical Constraints Information

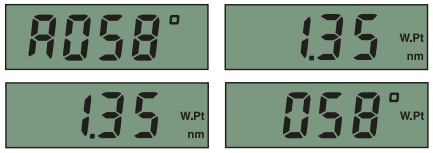
	Mechanical Restraints	
Wheel Taper Sizes	19mm (3.4")	25mm (1")
Max. Wheel Diameter	460mm (18")	
Max. Wheel Weight	1.8kg (3.96lb) mass with no one-handed wheel knobs	
Max. Wheel Torque	15Nm (11Ft lbs)	
Wheel Lock to Lock	2.5 to 5 turns	

ST1000 & ST2000 TILLER PILOTS: ABOVE DECK AUTOPILOTS FOR TILLER STEERED YACHTS

ST1000/ST2000

Invented by Autohelm in 1973, tiller pilots have consistently been the world's most popular pilot ever since, setting the standard for performance, reliability and ease of use. Advanced features are standard. AutoTack lets you handle the sheets while the pilot tacks the boat and AutoSeastate intelligently keeps the boat on course while conserving power.

Whether used as a stand-alone pilot or with a SeaTalk/NMEA GPS, the clear backlit LCD and 6-button keypad make these pilots safe and easy to use.



	Recommended Maximum Displacement*
ST1000	3,000kg (6,600lbs)
ST2000	4,500kg (10,000 lbs)

*Remember, always take the fully laden displacement weight of your vessel into account, this is often 20% above the designed displacement, so don't be tempted to choose a pilot which will always be working at the limits of its design capabilities. If you choose your pilot with safety in mind, it won't struggle when the going gets tough.

GOTO page 108 for product specifications

SPX-5 & SPX-5GP TILLER DRIVE AUTOPILOTS

The rugged SPX-5 and SPX-5 GP Tiller Pilots are perfect for large tiller steered yachts up to 6,000kg (13,200lbs) and 7,500kg (16,000lbs) displacement respectively.

You can steer straight to a waypoint, lock on to a given wind angle, or simply set and follow a course to steer by making the most of the full SeaTalk and NMEA compatibility. The fluxgate compass is separated from the drive unit for greater accuracy and you can mount the control unit wherever it will be within easy reach for you. Used by some of the world's top single-handed sailors, Raymarine tiller pilots meet the demands of the serious sailor. The SPX-5 Tiller Pilot is suitable for most cruising and racing scenarios, however, extended cruising or challenging racing conditions may benefit from the added ruggedness of the SPX-5 GP Tiller Pilot. Whichever you choose, the large clear display shows you up-to-the-minute information and also acts as a multifunction instrument or navaid repeater.

	Recommended Maximum Displacement*
SPX-5 Plus Tiller Pilot	6,000kg (13,200lbs)
SPX-5 GP Tiller Pilot	7,500kg (16,500 lbs)

*Remember, always take the fully laden displacement weight of your vessel into account, this is often 20% above the designed displacement, so don't be tempted to choose a pilot which will always be working at the limits of its design capabilities. If you choose your pilot with safety in mind, it won't struggle when the going gets tough.

Note: For extended cruising, we recommend the use of the more powerful SPX-5 GP Tiller Drive.

Note: The SPX-5 Tiller Drive Autopilots do not require Rudder reference transducers.

Features

- Unique tiller pilot system with full function ST6002 control head and remote mounted fluxgate compass.
- The SPX-5 Tiller Pilot is supplied with the ST6002 Control Head. However, additional controls (ST7002 and ST8002) are available for second station installations as well as wireless remote controls.
- Powerful tiller drive unit is compact and unobtrusive.
- Smart Rudder Sense™ (SRS) enabled – Rudder Reference Transducer not required.

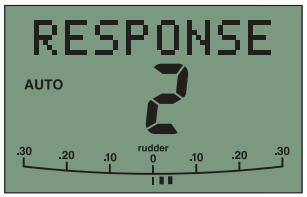
Installation

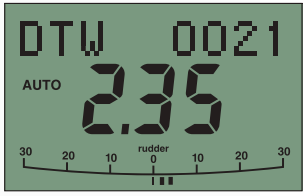
We recommend that you consult a Raymarine approved dealer who can specify, install and commission the correct Raymarine system for your boat. An approved installation also carries our full worldwide 2 year warranty.

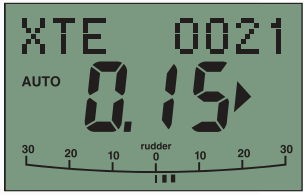
The SPX-5 course computer, the 'brains' of the Tiller Drive Pilots.

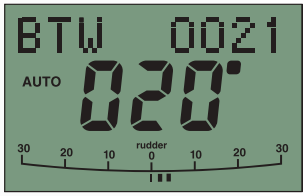
SPX Autopilots. Easy to install and service, fuel efficient, energy efficient, accurate tracking and accurate steering.

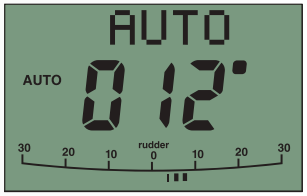
SMARTPILOT SPX











Data displays can be accessed via the display key (maximum of 15 displays).

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SMARTPILOT INBOARD AUTOPILOT SYSTEMS

Next to choosing the boat itself, choosing the right autopilot can be one of the most important decisions a boat owner has to make. With a vast array of autopilot models and configurations to choose from, selecting the right autopilot can seem like a daunting task. The following pages are designed to help you choose the right Raymarine SmartPilot system for your boat.

An inboard autopilot system consists of three elements:

Autopilot Control Head
This is the display unit you use to control your autopilot system. Raymarine offers a number of options, including multiple control heads, as well as full-function remotes and joystick controls.

Course Computer
The course computer is the central intelligence hub of the autopilot system, linking the autopilot control head to the drive unit.

Every SPX system – from the largest SPX-30 to the entry-level SPX-5 – comes with a rate gyro to provide the best possible performance.

SPX uses Advanced Steering Technology (AST), which intelligently monitors the yaw of the vessel and actually anticipates course changes as well as ensuring razor-sharp course keeping.

SPX features Raymarine's proven AutoLearn function, so the pilot automatically understands the vessel's steering characteristics, simplifying calibration and allowing the vessel to constantly adapt to changing sea conditions.

Smart Rudder Sense™
SPX is enabled with Smart Rudder Sense™ technology allowing precise steering without the use of a rudder feedback sensor. This innovative feature is ideal for outboard engines and installations that can not fit a rudder sensor.

Drive Unit
The drive unit is the part that interfaces with your vessel's steering system to keep you on the right course. Raymarine has a broad range of drive units to match almost any type of steering system.

Over the next few pages, we'll explain the factors to consider when choosing each of these parts of your system.

Corepack consisting of: course computer, fluxgate compass and cabling (Rudder Reference Transducer included with SPX-30 and SPX-SOL corepacks).

STEP 1.0 DRIVE UNIT SELECTION

Know your boat and your steering system
The first step in selecting a Raymarine autopilot is to choose the proper autopilot drive unit for your vessel. Raymarine autopilot drive units are available in an array of sizes and configurations to accommodate various steering types and vessel displacements.

What type of steering system do you have?
To select an autopilot correctly, you will need to find out what type of steering system is installed on your vessel. This may involve opening a few hatches and looking at the gear, or this can be a simple case of consulting your boat dealer or steering manufacturer.

Raymarine SmartPilot systems accommodate hydraulic, mechanical and power assisted stern drive systems. If you are not sure how to determine what type of steering system is installed on your vessel, please consult an authorised Raymarine dealer. Raymarine dealers are well-skilled and have been Raymarine trained to evaluate and assist you in selecting the right autopilot for your boat.

STEP 1.1 HYDRAULIC STEERING SYSTEMS

Raymarine SmartPilots connect to hydraulic steering systems using a rugged hydraulic pump matched to the capacity of the hydraulic steering system. To match a Raymarine SmartPilot hydraulic pump to your vessel you need to know the size (in cc) of the hydraulic cylinder ram(s) that is mounted to the rudder on inboard engined boats, or mounted to the drive unit on outboard engined boats. Your steering system documentation will have this information. Alternatively, you can look on the cylinder ram itself for the brand and model number. Once you know the model number, visit our website (**www.raymarine.co.uk**) and access our hydraulic cylinder ram cross-reference guide to determine which hydraulic autopilot pump is compatible with your vessel's hydraulic steering system.

Raymarine autopilot hydraulic pumps are available in several sizes to accommodate the broad range of steering cylinder capacities. The table below shows the capacity of each Raymarine hydraulic autopilot pump when used with the corresponding SmartPilot course computers.

TechTip

Installation. We recommend that you consult a Raymarine approved dealer who can specify, install and commission the correct Raymarine system for your boat. An approved installation also carries our full worldwide 2 year warranty.

	HYDRAULIC STEERING SYSTEMS			
DRIVE TYPE	**TYPE 0.5**	**TYPE 1**	**TYPE 2**	**TYPE 3**
Vessel displacement	Not applicable for hydraulic steering as the drive unit is matched to the ram capacity of the steering system			
Ram capacity	50–110cc	80–230cc	230–350cc	350–500cc
Maximum stall pressure at 12V	50 bar	50 bar	100 bar	80 bar
Peak flow rate (no load)	650 cc/min	1000cc/min	2000cc/min	2900cc/min
Course computer used	**SPX-10**	**SPX-10**	**SPX-30**	**SPX-30**

- In some systems with dual steering rams in parallel, cylinder capacity is the total of both rams, rams in series only require single capacity valve.
- Hydraulic steering systems with steering rams over 500cc require our larger constant running hydraulic pump used in conjunction with S3 or S3G and SPX-SOL course computers – contact Raymarine for details.
- An authorised Raymarine dealer is best suited to installing a hydraulic autopilot system.
- Type 0.5 suitable for Volvo D4 Sterndrive applications.

STEP 1.2 MECHANICAL STEERING SYSTEMS

When selecting an autopilot drive unit for a mechanical steering system, the vessel displacement is the determining factor for selecting the correct drive. **When determining your vessel displacement, always add 20% to the displacement of your vessel to account for the added weight of fuel, gear, provisions and people.** Raymarine SmartPilot drive units for mechanical steering systems are available in linear, hydraulic linear and rotary configurations.

Hydraulic linear drives

Designed for larger mechanically steered vessels over 20,000 kg, our hydraulic linear drives are self-contained hydraulic steering systems consisting of a reversing pump, reservoir and hydraulic ram.

	HYDRAULIC LINEAR DRIVES	
Drive Type	**TYPE 2**	**TYPE 3**
Maximum boat displacement	22,000 kg	35,000 kg
Peak thrust	585 kg	1,200 kg
Maximum stroke	254 mm	300 mm
Hard-over to hard-over times	10 seconds	10 seconds
Maximum rudder torque	1,270 mm	3,200 mm
Corepack used	**SPX-30**	**SPX-30**

- A hydraulic linear drive unit connects to the rudder stock via an independent tiller arm. Accessory fittings from your steering system manufacturer may be required.
- An authorised Raymarine dealer is best suited for installing a linear drive system.
- Must be able to back drive steering system for the rudder.

Universal stern drive

The universal stern drive is for use with inboard/outboard (I/O) vessels with power assisted steering.

	UNIVERSAL STERN DRIVE
Maximum boat displacement	Does not apply
Drive method	Electromechanical
Maximum thrust	50kg
Recommended hard-over times	8.8 seconds
Maximum stroke	214mm
Corepack used	**SPX-10**

- **Always verify compatibility before installing a drive unit by consulting an authorised Raymarine dealer or Raymarine's Customer Support team.**
- The drive is compatible with 1997 or later Mercruiser power assist inboard/outboard drives and Volvo Penta.
- Vessels with 12V systems only.
- An authorised Raymarine dealer is best suited for installing a linear drive system.
- Compatible with Volvo Penta and Mercruiser I/O drive engines – see dealer for bracket options with standard I/O drive.

STEP 1.2 MECHANICAL STEERING SYSTEMS CONTINUED...

Mechanical linear drives

Our most commonly used drive types for sailing vessels. Raymarine mechanical linear drives provide powerful thrust, fast hard-over times and quiet operation. Mounted below decks, the linear drive moves the rudder directly by pushing the tiller arm or a rudder quadrant.

	MECHANICAL LINEAR DRIVES		
DRIVE TYPE	**TYPE 1**	**TYPE 2 SHORT**	**TYPE 2 LONG**
Maximum boat displacement	11,000 kg (24,000 lb)	15,000 kg (33,000 lb)	20,000 kg (44,000 lb)
Peak thrust	295 kg (650 lb)	480 kg (1,050 lb)	480 kg (1,050 lb)
Maximum stroke	300 mm (12")	300 mm (12")	400 mm (16")
Hard over to hard over times (+/- 35°, no load)	11 seconds	11 seconds	14 seconds
Maximum rudder torque	735 nm (6,500 lb.in)	1,190 nm (10,500 lb.in)	1,660 nm (14,700 lb.in)
Power consumption	18–36 W	48–72 W	48–72 W
Corepack used	**SPX-10**	**SPX-30**	**SPX-30**

- A linear drive unit connects to the rudder stock via an independent tiller arm. Accessory fittings from your steering system manufacturer may be required.
- An authorised Raymarine dealer is best suited for installing a linear drive system.
- Must be able to back-drive steering system from the rudder.

Mechanical rotary drives

The rotary drive is designed for power and sailboat systems that can be driven from the helm position through a chain and sprocket (e.g. cable and rod steering systems). The outstanding design of the Raymarine rotary drive unit provides smooth, powerful autopilot controlled steering with quiet operation. Use the table below to select a rotary drive suitable for your vessel displacement.

	MECHANICAL ROTARY DRIVES	
DRIVE TYPE	**TYPE 1**	**TYPE 2**
Maximum boat displacement	11,000 kg	20,000 kg
Peak output torque	20 nm	34 nm
Maximum shaft speed	33 rpm	33 rpm
Recommended hard-over times (no load)	10 seconds	10 seconds
Power consumption	24–48 W	60–84 W
Corepack used	**SPX-10**	**SPX-30**

- Optional drive sprockets and modification to the steering chain may be required.
- An authorised Raymarine dealer is best suited for installing a linear drive system.

STEP 2. YOUR COURSE COMPUTER

Having selected the correct drive unit, this defines which corepack, including the course computer is suitable for your boat. SmartPilot course computers use Raymarine's Advanced Steering Technology (AST).

	SPX COURSE COMPUTERS				
CORE PACKS	**SPX-5**	**SPX-10**	**SPX-30**	**SPX-SOL**	**SPX-CAN**
Compatible drive types	Sp/Wh/Ti	1	1/2/3	Solenoid	Volvo Penta IPS
Supply voltage – volts	12	12/24	12/24	12/24	12/24
Motor drive current (continuous peak) – Amps	5 (10)	10 (25)	30 (50)	–	5 (10)
Clutch current – Amps	–	1.2	3	–	2
SeaTalk current	2	2	3	3	3
NMEA 0183/2000	Yes	Yes	Yes	Yes	Yes
Fishing Patterns (via ST70 autopilot head)	Yes	Yes	Yes	Yes	Yes
Built-in rate gyro	Yes	Yes	Yes	Yes	Yes
Advanced steering technology (AST) with AutoLearn	Yes	Yes	Yes	Yes	Yes
Rudder reference less	Yes	Yes	Yes*	No	–
Fast heading data output: NMEA 0183 – 5Kz, SeaTalk*ng* – 10Hz	5/10 Hz	5/10 Hz	5/10 Hz	5/10 Hz	5/10 Hz

* Supplied with rudder reference transducer for enhanced performance.

Sp = Sport drive Wh = Wheel drive Ti = Tiller drive

What's in the box...

- SmartPilot course computer.
- Fluxgate compass.
- Cabling.
- SPX-30 and SPX-SOL pilots include Rudder Reference Transducer.

More powerful and rugged than ever before, SmartPilot course computers serve as the central intelligence hub of our inboard pilot systems.

STEP 2. YOUR COURSE COMPUTER CONTINUED...

SPX with Advanced Steering Technology (AST)

SPX pilots have a built-in Rate Gyro brings autopilot performance to a new level. The Rate Gyro enables Raymarine's Advanced Steering Technology (AST) software to intelligently monitor the yaw of the vessel and actually anticipates course changes. A specially developed course control algorithm then delivers razor sharp course keeping without instability or overshoot. This gyro enhanced autopilot performance and advanced software is especially valuable in difficult steering situations, such as downwind with a following sea. Raymarine's AST software also enables SPX pilots to 'AutoLearn' the vessels steering characteristics, simplifying calibration and allowing the autopilot to constantly 'adapt' to changing sea conditions.

SPX Autopilots. Easy to install and service, fuel efficient, energy efficient, accurate tracking and accurate steering.

SMARTPILOT SPX

Fishing Patterns

MARPA and Radar/Chart Overlay.
SPX course computers also provide accurate and stable heading data for MARPA and chart overlay functions on Raymarine's multifunction displays.

Control the way the pilot steers your boat.
Using sensitive response AST for the most comfortable ride or to conserve power on long sail passages.

Set your pilot up for optimum performance.
Using the intelligent AutoLearn function with new control units, AST* and AutoLearn* software to automatically learn your boat's handling characteristics.

Dodge function. Use the dodge function to return to a heading or track after a dodge manoeuvre.

Make crosstrack error a thing of the past.
Use your inboard autopilot with a Raymarine GPS to track straight to your next waypoint.

Stay right on course when the going gets tough.
Using Fastrim AST to correct any changes in standing helm to keep the vessel on course (e.g. weather helm or loss of one engine).

Course computer features

- New dodge function with ST70 Autopilot Control Head – view your choices with ST70.
- SeaTalk networking – SeaTalk and SeaTalk*ng*.
- Speed connectors for wiring.
- Simple installation – fixes with two screws.
- Connects to ST6002/ST7002/ST8002 control heads, ST290 keypads, wireless remote controls and ST70 Autopilot control head.
- Easy access enclosure.
- Current limiting protection.
- Switchable NMEA2000 and clutch power.
- Professional fishing patterns.

STEP 3. CHOOSING YOUR CONTROL HEAD

The final step to building a Raymarine SmartPilot system is selection of an autopilot control head. Here the decision is a matter of personal choice since each fixed-mount SmartPilot Control Head will offer the same level of autopilot performance. Adding additional control heads is easy thanks to Raymarine's SeaTalk networking.

	CONTROL HEADS					
	ST6002	ST7002	ST8002	ST70	S100*	WIRELESS SMART CONTROLLER*
Control type	Button	Button	Button / Rotary	Button	Button	Button
LCD size	81mm	98mm	98mm	95mm	–	–
Character size	18mm	30mm	30mm	Variable	8mm	16mm
Customisable SeaTalk data pages	15	15	15	3 Boxes	No	8
Power steer mode	No	No	Yes	No	No	No
AST and AutoLearn	Yes	Yes	Yes	Yes	AST Only	AST Only
Optional second or multi-station control heads	Yes	Yes	Yes	Yes	Yes	Yes
Mounting	Flush/ surface	Flush/ surface	Flush/ surface	Flush/ surface	Cradle/ belt clip	Cradle/ belt clip
Full calibration	Yes	Yes	Yes	Yes	No	No

* Must have a fixed head for calibration purposes.

ST6002 CONTROL HEAD

The updated ST6002 Control Head is perfect when space is limited, its clear LCD display with up to 15 SeaTalk data pages allows you to monitor important navigational data as well as control the autopilot.

- Compact and stylish control head matches Raymarine ST60+ as well as multifunction displays.
- Easy to read high-contrast display.
- Simple setup and calibration with AutoLearn.
- A versatile data repeater with 15 configurable instrument/navigation data pages.
- Intuitive Autohelm pilot controls.
- Rudder angle indicator.
- Programmable AutoTack control.
- Surface mount (standard) or optional flush-mount fascia.
- Compatible with all SmartPilot corepacks and drive units.
- Available in convenient preconfigured SmartPilot system packs (with corepack and drive unit) for sail and power applications.

ST7002 CONTROL HEAD

A powerful and versatile large control unit, the ST7002 is really simple to use. Its large informative display and intuitive keypad provide quick and easy access to all autopilot information as well as up to 15 pages of selectable instrument and navigation data pages. Ideal for longer passages, the response function controls the way the pilot helms the boat, ensuring the most comfortable ride at all times while keeping you right on course.

- Large crisp LCD display with easy-to-read rudder angle indicator.
- Simple setup and calibration with AutoLearn.
- A versatile data repeater with 15 configurable instrument/navigation data pages.
- Remote ST60+ instrument control feature allows control of ST60+ instrument displays from the ST7002 keypad.
- Intuitive keypad and the proven Autohelm button control.
- Programmable AutoTack control.
- Surface mount (standard) or optional flush-mount fascia.
- Compatible with all SmartPilot corepacks and drive units.
- Dedicated controls for response, resume and set course.

ST8002 CONTROL HEAD

Simply dial in your destination and press AUTO. The ST8002 puts total helm control at your finger tips with an easy-to-use rotary control for precise course changes and power-steering control. The large LCD displays large high-contrast characters of pilot status, compass heading and user defined pages, transforming the ST8002 into a versatile navigation instrument repeater display.

- Large crisp LCD display with easy-to-read rudder angle indicator.
- Simple setup and calibration with AutoLearn.
- A versatile data repeater with 15 configurable instrument/navigation data pages.
- Compatible with all SmartPilot corepacks and drive units.
- Power Steer mode.
- Return rudder to midships by pressing the rotary control knob.

ST70 CONTROL HEAD

ST70 offers a new way of visualising instrumentation and autopilot control via a single high-resolution display.

Designed for simple setup and extensive user customisation, ST70 offers an array of intuitive digital, analogue, graphical and history display options.

- Simple start-up wizard quickly configures the autopilot.
- Compatible with SPX course computers
- Choose from digital display, compass rose or 3D isometric screens.
- Capable of displaying an additional 3 boxes of instrument data.
- Multilingual.
- New simplified set-up and calibration configuration.
- Surface or flush mount.
- Power on/off switch.
- Can be used as a master display or a colour repeater to an existing system.
- Intuitive dodge function when connected to an SPX course computer and extensive fishing patterns.

ST70 PLUS AND KEYPADS

The ST70 Plus display is designed primarily for sail and powerboats over 12m (40') and is the perfect partner for Raymarine multifunction displays.

ST70 Plus is fully customisable, allowing you to view information when you want it and where you want it, be it in digital or analogue format, full screen or in user defined windows.

The button-less displays are operated by dedicated keypads – there's a push-button only pilot keypad for sailboats and a rotary for powerboats.

- Simple start-up wizard quickly configures the autopilot.
- Compatible with SPX course computers.
- Choose from digital display, compass rose or 3D isometric screens.
- Capable of displaying an additional 3 boxes of instrument data.
- Multilingual.
- New simplified set-up and calibration configuration.
- Surface or flush mount.
- Can be used as a master display or a colour repeater to an existing system.
- Intuitive dodge function when connected to an SPX course computer and extensive fishing patterns.

GOTO pages 102 & 113 for product specifications

Volvo Penta IPS Drive System

page 112 for product specifications

SPX-CAN AUTOPILOT FOR STEER-BY-WIRE PROPULSION SYSTEMS

Designed to integrate with the innovative steer-by-wire CAN based system (CAN driven and Volvo Penta IPS) the Raymarine SPX-CAN represents the convergence of autopilot and propulsion technology. Employing Raymarine's proven AST (Advanced Steering Technology), the SPX CAN delivers razor sharp course keeping and smooth course turns, in conjunction with the SPX-CAN 'steer by wire' propulsion system. CAN Bus communication protocols, provides the SPX-CAN with single cable interface to steer-by-wire. Raymarine's proven SeaTalk technology provides boat owners with their choice of multiple SmartPilot control heads as well as seamless integration with Raymarine's multifunction displays and instrument systems.

- Steer-By-Wire Technology.
- Simplified CAN Bus Autopilot Interface.
- Advanced Steering Technology (Smartpilot AST).

Note: Volvo Penta pilot interface required.

Autopilot Control Head.
Choose from ST70, ST6002, ST7002 or ST8002 variants.

SPX-SOL SOLENOID INBOARD PILOT

The Raymarine SPX-SOL autopilot is compatible with solenoid drive systems and, like other SPX autopilots, offers performance enhancements with built-in AST (Advanced Steering Technology) and AutoLearn software.

When used with an ST70 Autopilot head, the SPX-SOL autopilot also gives you access to a wide range of fishing patterns.

Features

Compatible with:

- Solenoid drive systems.
- Hydraulic Drive systems with steering ram capacity from 21-73 cubic inches (350-1200cc).
- Raymarine Constant Running Hydraulic Pumps (12 volt from 3.0 to 4.5L and 24 volt from 3.0 to 4.5L).
- Drives 12V or 24V by-pass valve, up to 2A current draw.
- Designed to drive 12V or 24V solenoid valves, up to 5A current draw.

S1000 INBOARD AUTOPILOT WITH WIRELESS REMOTE CONTROL

Do you...

- Need an 'extra pair of hands'?
- Want to reduce fatigue on long journeys out to a favourite fishing spot?
- Want better fuel economy and shorter routes to waypoints?
- Have a powerboat typically 7.7m (25') or under with a balanced hydraulic system?

Yes? Then this is the autopilot for you

The S1000 'all-in-the-box' autopilot is for powerboats with balanced hydraulic systems (see **www.raymarine.co.uk** for steering system compatibility). Complete with everything needed for easy installation, the S1000 is quick to fit and simple to use. No added complications from electronic compass or rudder reference transducers – the S1000 doesn't need them.

Control the S1000 autopilot with the S100 wireless remote; simply steer on to your desired heading, press PILOT to engage the pilot in to auto and off you go. To adjust your heading at any time, simply press the port/starboard arrow keys until the heading you want is displayed. To disengage the pilot, press STANDBY – that's all there is to it!

S1000 Features

- A 'back to basics' point and shoot autopilot.
- Designed for balanced hydraulic systems.
- No electronic compass or rudder reference transducer needed.
- NMEA input from handheld or fixed GPS/Navigator/Plotter.
- Built-in fishing patterns include cloverleaf, zig-zag and circle.
- Troll at speeds as low as 1 knot (subject to environmental conditions).
- Can be linked to kicker motor.
- SeaTalk GPS/Plotter compatible.

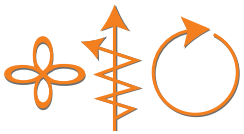
The below diagram shows the S1000 entry level autopilot and its component parts.

What's in the box...

- Installation video – watch before you fit.
- Wireless S100 handheld controller with lanyard, belt clip and 2 (two) storage cradles.
- Easy-install S1000 course computer.
- Hydraulic pump supplied pre-assembled with swaged hydraulic hoses.
- Bleed kit: oil, container, gloves, wrenches and connectors.

Fishing Patterns

The S1000 incorporates a number of dedicated fishing patterns. Patterns include: Cloverleaf, Zig Zag and Circle.



S100 WIRELESS AUTOPILOT REMOTE

The compact S100 gives you basic, onboard wireless control of any Raymarine SeaTalk autopilot, even if you're below deck and out of sight of your autopilot.

Easy operation and intuitive menu structure for easy access to all features. The S100 is powered by two AAA alkaline batteries.

- Wireless autopilot controller.
- Plug and play – easy installation in just a few minutes.
- Latest and most reliable wireless technology (IEEE 802.15.4).

Display Features

- Two lines of text.
- Crisp, high contrast 24 x 127 dot matrix display.
- Signal strength indicator.
- Graphical illustration of autopilot mode selected.
- Raised profile on Standby button for easy nighttime identification.

Networking Features

- Wireless up to 10m (32') from base station.
- Warning signalled when the remote is out of range of the base station.
- Pre-registered – each unit leaves the factory already registered to the base station.
- Add additional base stations for extended range.
- Add handsets for additional users and customise for individual preferences.

SMARTCONTROLLER AUTOPILOT REMOTE

Take full, onboard control of your Raymarine SeaTalk autopilot with the wireless SmartController. Wireless operation means freedom to monitor vital information when you're on deck or out of sight of your instruments.

Lightweight and compact for easy handling, the SmartController is a breeze to use thanks to its intuitive interface.

Display Features

- Eight user-definable pages show one, two or four lines of text and graphics including rolling road for cross track error.
- Crisp, high contrast 64 x 127 pixel dot matrix display.
- Raised profile on Standby button for easy nighttime identification.
- Keylock security.
- Backlit buttons.
- Battery and signal strength indicator.
- Warning when the remote is out of range of the base station.
- Display of local and system alarms.

Network Features

- Wireless, full function autopilot controller*.
- Wireless SeaTalk instrument repeater.
- Plug and play – easy installation in just minutes.
- Latest and most reliable wireless technology (IEEE 802.15.4).
- Wireless range up to 10m (32') from base station.
- Rechargeable via SeaTalk network.
- Add additional base stations for extended range.
- Add handsets for additional users and customise for each individual.

* Note: does not calibrate pilot – to calibrate pilot use ST70/ST6002/ST7002/ST8002 control heads.

TechTip

Both the SmartController and the S100 Wireless Remote are compatible with all Raymarine SeaTalk pilots.

GOTO page 114 for product specifications

G SERIES

P10

E SERIES

P16

C SERIES WIDESCREEN

P22

Raymarine
XTE
0.05 NM
150° M
1.40 NM
PAGE
MENU
MODE
STANDBY
PILOT
SmartController

PILOT

72
RAY240E VHF
MENU
LAST PRIV
CH
1/25
16
MEM
WATCH
SCAN
SQ
Raymarine

RAYMARINE VHF COMMUNICATIONS

Raymarine's communications systems combine innovative, state-of-the-art technology with rugged waterproof construction, designed to withstand life at sea.

Select the right radio for your boat – single or multi-station VHFs, Class D DSC (Digital Selective Calling) with SeaTalk and NMEA connectivity. Whether blue water cruising or fishing inshore, Raymarine have what you need for communication safety at sea.

What is DSC?
Digital Selective Calling (DSC) is a global protocol that uses channel 70 (156.525 MHz) to transmit and receive digital messages. It works on DSC equipped VHF radios and is used for individual, 'all ships' and distress calls. DSC also enables you to selectively alert single or multiple boaters of incoming VHF calls by using stored MMSI (Maritime Mobile Station Identifier) numbers, similar to making a phone call.

You can also poll another boat to obtain its GPS position and display it on a Raymarine multifunction display.

DSC safety digital Mayday.
If you are unfortunate enough to find yourself having to make a mayday call, the last thing you need is extra complication. Making a DSC distress call is simple with Raymarine's DSC equipped VHFs. Just press the button, clearly marked in the back of the handset, and GPS position and time information are transmitted in a digital 'packet' complete with the vessel's Maritime Mobile Station Identifier (MMSI) telling other ships and shore stations exactly where you are and that you are in a distress situation. This simple procedure can dramatically increase your chance of a successful rescue compared to a traditional Mayday voice call.

RAY240E MODULAR CLASS D DSC VHF

The Ray240E is a combination VHF radio and Class D DSC communications system designed for easy integration with Raymarine products.

The system operates from a waterproof cell-phone-style handset, with a loudspeaker for exterior or interior use, and a base station that can be mounted out of sight.

Add a second handset and powered speaker for full function VHF and DSC communications on each handset and an intercom between stations.

Add a hailer horn (optional) to the built-in programmable auto fog alert and multiple siren alert tones to turn your 240E into a VHF hailer foghorn combination.

DSC Position Request polls other DSC equipped vessels and displays their position on screen. Connect the 240E with a compatible chartplotter for a DSC 'pop up' alert, making it easy to navigate to another vessel's transmitted position, be it a friend's boat or a 'digital mayday' location.

VHF Radio Warranty

External speaker

Distress button

Alphanumeric keypad

GOTO page 117 for product specifications

RAY430 LOUDHAILER, FOGHORN & INTERCOM

The Ray430 loudhailer has eight foghorn signals, including an automatic foghorn when underway. Connect it to a vessel security system for an extra loud alarm siren if a sensor is activated, or add up to four remote intercom stations for complete onboard communications. 30 watts of output power means you will be loud and clear!

RAYMIC

Optional handset for Ray218E and Ray55E VHF radios providing a complete hand-held, full-function, second station or an intercom handset.

GOTO pages 117 – 118 for product specifications

3 Years
VHF Radio Warranty

FEATURES	RAY240E	RAY218E	RAY55E	RAY49E
Class D DSC (Digital Selective Calling) transceiver	●	●	●	●
'DSE' NMEA sentence for 3 decimal position precision	●	●	●	●
DSC Distress key transmits GPS position and a digital mayday	●	●	●	●
Dual and Tri Watch	●	●	●	●
Built-in Hailer with "Listen Back" capability and automatic fog horn	● (22 Watt)	● (30 Watt)		
NMEA 0183 input with GPS Position, COG and SOG display	●	●	●	●
Chartplotter position polling using NMEA 0183 output	●	●	●	●
Easy-to-use rotary controls for channel, volume, squelch and menu operation		●	●	●
Extra large dot matrix LCD	●	●	●	Segmented LCD
Speaker microphone with controls and remote mount option		●	●	
Dual Channel Display (2UP Mode) displays active channel and standby channel		●	●	
Programmable favorite channel soft keys (1UP Mode)		●	●	
Quick Access 16/Plus Key	●	●	●	●
4 Scan modes: All scan, saved (memory) scan, priority all scan and priority saved scan	●	●	●	●
Programmable Scanning	●	●	●	●
Submersible (IPX7 Standard)	●	●	●	●
Superior receiver with excellent intermodulation rejection		●	●	
Rugged housing with a low profile bezel using the optional flush mount kit		●	●	●
Optional Raymic remote station handset serves as full function second station		●	●	
External speaker output	●	●	●	●
NMEA 0183 input	●	●	●	●
Powered Loudspeaker with On/Off Switch	●			
Phone style handset with alphanumeric keypad	●			
Second station option	●	RayMic	RayMic	

RAY218E FIXED-MOUNT CLASS D DSC VHF

RAY55E FIXED-MOUNT CLASS D DSC VHF

RAY49E FIXED-MOUNT CLASS D DSC VHF

RAY218E FIXED-MOUNT CLASS D DSC VHF

Delivering exceptional performance, the Ray218E's long list of standard features includes Class D Digital Selective Calling, built-in hailer and chartplotter position polling. For more flexible communication functions the Ray218E can be expanded with the powerful RayMic remote handset. Add a RayMic for full function radio control and intercom capability from a remote station on board.

RAY55E FIXED-MOUNT CLASS D DSC VHF

The Ray55E VHF radio offers unmatched performance and style. Expand the Ray55E with the powerful RayMic remote handset. The optional RayMic handset enables full function radio control and intercom capability from a remote station on board.

RAY49E FIXED-MOUNT CLASS D DSC VHF

A compact, easy-to-use fixed-mount VHF radio with fist microphone and built-in speaker. This powerful VHF is available in grey or white finishes and has a clear and bright LCD display with large easy-to-read digits and rotary controls for channel, volume, squelch and menu operation.

RAY101E HANDHELD VHF

Rugged and reliable, the Ray101E uses long lasting Nickel Metal Hydride (NiMH) batteries with 1300mA capacity. User friendly, the Ray101E has easy left or right hand operation with backlit keys and large LCD display. Supplied with 6 NiMH rechargeable cells, quick charger, charger base, wrist strap and belt clip.

Features

- Large high-contrast LCD display.
- Backlit keys and backlit LCD display for night time use.
- Rapid drop-in charger and Nickel Metal Hydride batteries for charging at anytime.
- Battery tray accepts both AA size NiMH and Alkaline batteries.
- No expensive battery packs required.
- 12v cigarette lighter adapter included.
- Wrist strap and belt clip included.
- Quick access 16 Plus priority key.
- Tri-watch.
- Rotary volume and squelch controls.
- 3 year limited warranty.
- IPX7 waterproof standard: submersible to 1 metre for at least 30 minutes.

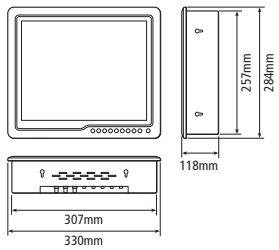
GOTO pages 118 – 119 for product specifications

G Series Displays

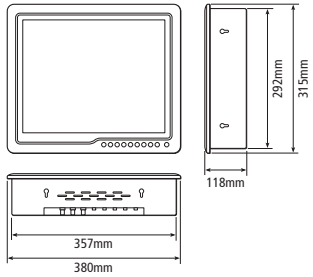
GENERAL	
Power:	
Nominal voltage (volts DC)	12V and 24V systems
Absolute voltage range	10.7 – 32 volts DC
Power consumption (typical)	G120/G150: 4 amps at 12V DC 2 amps at 24V DC / G170/G190: 7.6 amps at 12V DC 3.5 amps at 24V DC
Physical:	
Dimensions (WxHxD) mm	G120: 330x284x118 / G150: 380x315x118 / G170: 415x358x100 / G190: 453x388x100
Product weight kg (lbs)	G120: 4.6 (10) / G150: 5.8 (12) / G170: 6.4 (14) / G190: 7.3 (16)
Mounting methods	panel only
Waterproofing standard	fascia waterproof to IPX6 standards when console mounted. suitable for external console mounting (flybridge or open cockpit). The G120, G150, G170 and G190 are not designed for external yoke bracket mounting.
Display	
Display size (diagonal)	G120: 305mm (12") / G150: 381mm (15") / G170: 432mm (17") / G190: 483mm (19")
Backlighting	100 levels
Inputs	3 VGA inputs, 2 DVI inputs, 3 composite video inputs, 1 S-Video input
Picture in picture	✓ – 3 stages (child, split and wide screen)
Display resolution	G120/G150: XGA 1024x768 / G170/G190: SXGA 1280x1024 (supports higher resolutions to 1600 x 1200 pixels (UXGA) using a built-in scaler)
Display brightness*	G120/G150/G170: >1,000cd/m² / G190: >850cd/m² (*ratings dependent on lighting conditions)

Ordering Information

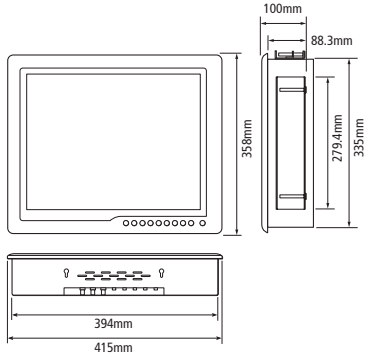
G SERIES	
E02034	G120: 12" ultra bright marine display
E02035	G150: 15" ultra bright marine display
E02036	G170: 17" ultra bright marine display
E02037	G190: 19" ultra bright marine display
E06021	DVI-D cable – 5m
E06022	DVI-D cable – 10m
E55055	VGA cable – 10m
E55056	VGA cable – 20m



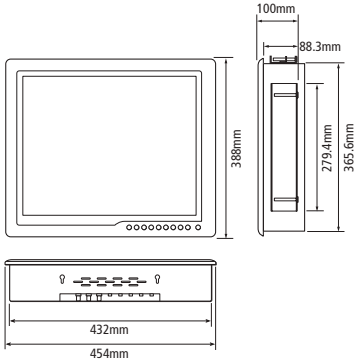
G120 12" MARINE MONITOR



G150 15" MARINE MONITOR



G170 17" MARINE MONITOR



G190 19" MARINE MONITOR

Pages 11 – 15 for product information

For Cables & Accessories see page 120

G Series Processor Modules

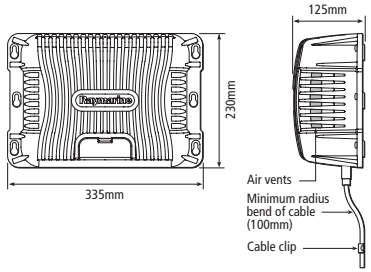
GENERAL	GPM400 PROCESSOR MODULE	GVM400 VIDEO MODULE
Power:		
Nominal voltage (volts DC)	12V and 24V systems	12V and 24V systems
Operating voltage (volts DC)	10.7 – 32V	10.7 – 32V
Power consumption (no external loads)	3A at 12V, 1.5A at 24V	650mA at 12V, 330mA at 24V
Power consumption (external loads)	5A at 12V, 2.5A at 24V	
SeaTalk/alarm power output	250mA at 12V	
Physical:		
Overall dimensions (WxHxD) mm	335x230x125	237x170x56
Product weight kg (lbs)	6.5 (14.3)	0.8 (1.76)
Connections:		
Data	NMEA 0183 (x2), SeaTalk, SeaTalk*ng*, SeaTalk*hs*, Compact Flash, USB (software upgrade only)	SeaTalk*hs*
Video	DVI (x2) (optional VGA adaptor available)	inputs 1-3: composite video (PAL 626 line, NTSC 525 line) input 4: S-Video or composite video
Audio	stereo line out (rated 1V RMS)	stereo audio line in (rated 1V RMS) associated with input 4 (S-Video or composite)

G Series Keyboards

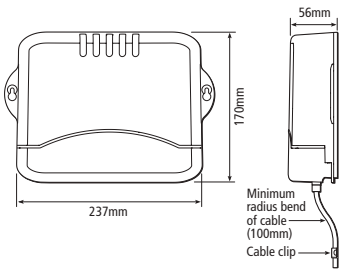
GENERAL	COMMAND CENTRE KEYBOARD	COMPACT KEYBOARD
Power:		
Nominal voltage (volts DC)	12V system (from SeaTalk*ng* bus)	12V system (from SeaTalk*ng* bus)
Operating voltage (volts DC)	9 – 16V	10 – 16V
Power consumption (standby) watts	1.5W	150mA
Physical:		
Overall dimensions (WxHxD) mm	297x98x46	163x97.5x29
Product weight kg (lbs)	0.65 (1.43)	0.35 (0.77)
Alphanumerical keypad	✓	✗
Connections:		
Data	SeaTalk*ng* SeaTalk*ng* RF (requires wireless upgrade kit and separate basestation)	SeaTalk*ng*

Ordering Information

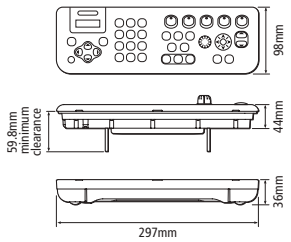
G SERIES	
E02047	GPM400 G Series processor module – EU
E02048	GPM400 G Series processor module – ROW
E02043	GVM400 G Series video module
E02044	G Series command centre keyboard (wired)
E02045	Wireless basestation
E02046	G Series command centre keyboard – wireless kit
E62154	G Series compact keyboard
E63069	DSM300 digital sounder module
E63072	DSM400 digital sounder module
E63074	DSM30 digital sounder module



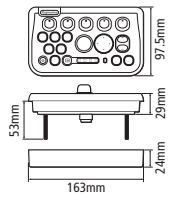
GPM400 PROCESSOR MODULE



GVM400 VIDEO MODULE



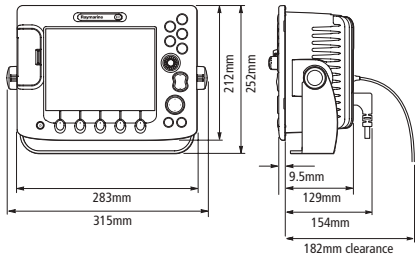
COMMAND CENTRE KEYBOARD



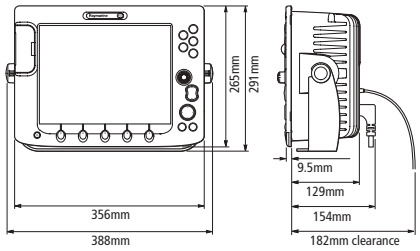
COMPACT KEYBOARD

Multifunction Network Displays

GENERAL	E80 8.4" MULTIFUNCTION NETWORK DISPLAY	E120 12.1" MULTIFUNCTION NETWORK DISPLAY
Power:		
Nominal voltage (volts DC)	12V and 24V systems	12V and 24V systems
Absolute voltage range (volts DC)	10.7 – 32 volts	10.7 – 32 volts
Power consumption (typical) watts	20W (full brightness)	32W (full brightness)
Physical:		
Overall dimensions (WxHxD) mm	refer to diagram	refer to diagram
Product weight kg (lbs)	4.18 (9.2)	7.35 (16.2)
Mounting methods	flush or bracket	flush or bracket
Display size and type	213mm (8.4") colour LCD	307mm (12.1") colour LCD
Display resolution	640x480 (VGA)	800x600 (SVGA)
Display lighting	high brightness direct sunshine visible/night mode	high brightness direct sunshine visible/night mode
Connections:		
SeaTalk^{hs}	✓	✓
SeaTalk	✓	✓
SeaTalk^{2}/NMEA 2000	✓	✓
Radar input	✓	✓
Video input	S video (x2) or composite video (x4)	S video (x2) or composite video (x4)
Video output (VGA)	(G Series marine monitors) 12", 15", 17", 19"	(G Series marine monitors) 12", 15", 17", 19"
NMEA input (0183)	1	1
NMEA output (0183)	1	1



E80



E120

Ordering Information

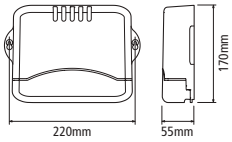
E SERIES	
E02011	E80 8.4" multifunction network display
E02013	E120 12.1" multifunction network display

OPTIONS	
E32042	Raystar125 SD GPS receiver
E63069	DSM300 digital echo sounder
E63074	DSM30 digital echo sounder
E52079	RD218 2kW 18" radome
E52080	RD424 4kW 24" radome
E52065	RD218 2kW 18" radome with 15m cable
E52067	RD424 4kW 24" radome with 15m cable
T52001-S	4kW 4' radar antenna (open array)
T52013-S	4kW 6' radar antenna (open array)
T52012-S	10kW 4' radar antenna (open array)
T52014-S	10kW 6' radar antenna (open array)
E55058	SeaTalk^{hs} network switch
E55060	SeaTalk^{hs} crossover coupler
E55059	NMEA 0183 multiplexer
E03015	AIS250 receiver module

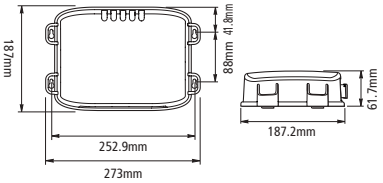
GOTO Pages 16 – 21 for product information

AIS Modules

GENERAL	AIS250 RECEIVER	AIS500 TRANSCEIVER
Power:		
Operating voltage (volts DC)	10.8 ~ 32V	10.8 ~ 32V
Power consumption (typical)	200mA	200mA
Physical:		
Overall dimensions (WxHxD) mm	237x170x55	273x187x62
Product weight kg (lbs)	0.54 (1.2)	0.54 (1.2)
Mounting methods	bulkhead	bulkhead
NMEA input (0183)	1x 38400/1x 4800 Baud	1x 38400/1x 4800 Baud
NMEA output (0183)	1x 38400/1x 4800 Baud	1x 38400/1x 4800 Baud
PERFORMANCE		
Operating frequencies	161.975 and 162.025MHz (multiplexed)	161.975 and 162.025MHz (multiplexed)
Channel spacing	25kHz	25kHz
Sensitivity	<-109dBm (receiver only)	<-109dBm (receiver only)
Data rate	9600Bps	9600Bps
Antenna impedance	50 ohm	50 ohm
Baud rate	38400/4800 Baud	38400/4800 Baud
Format	NMEA 0183	NMEA 0183
NMEA sentence	VDM	VDM



AIS250



AIS500

Ordering Information

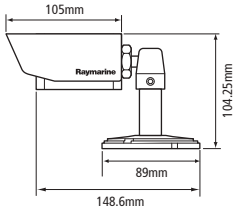
AIS250	
E03015	AIS250 receiver module
E62235	AIS500 transceiver module
R08278	AIS250 to VHF cable
R08277	Power cable – 1.5m

GOTO Page 45 for product information

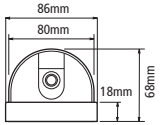
For Cables & Accessories see page 120

Marine Video Cameras

GENERAL	CAM100 DAY & NIGHT VISION MARINE VIDEO CAMERA	CAM50 COLOUR DOME CAMERA
Power:		
Power consumption	130mA Day, 280mA Night IR on, at 12V DC	80mA at 12V DC
Operating voltage	12V DC (+30% -10%)	12V DC (+30% -10%)
Physical:		
Overall dimensions (WxHxD) mm	refer to diagram	refer to diagram
Product weight kg (lbs)	0.28 (0.63)	0.31 (11oz)
Connections:		
Power connection	12V tinned leads	12V tinned leads
Video connection	male BNC	male BNC
Imaging:		
Format	PAL (752x582 pixels)	PAL (500x582 pixels)
Imager	1/3 Sony Super HAD CCD (Super Hi Resolution)	1/3 Sony Super HAD CCD (Super Hi Resolution)
Horizontal resolution	550TVL	380TVL
Format/scanning system	PAL 625 lines, NTSC 525 lines 2:1 Interlaced	PAL 625 lines, NTSC 525 lines 2:1 Interlaced
Video output	composite 75 Ohms	composite 75 Ohms
Infra red	14 IR LEDS	✗
LED spectrum	30° for 15m	✗
Min illumination	0.1 Lux at F2.0 (no IR), 0 Lux (with IR)	0.3 Lux at F2.0 (no IR)



CAM100



CAM50

Ordering Information

MARINE VIDEO CAMERAS

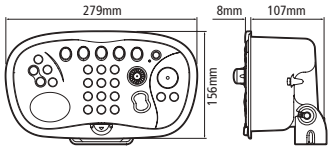
E03007	CAM100 (NTSC) camera for USA and Canada
E03006	CAM100 (PAL) camera for Europe and ROW
E03021	CAM100 reverse image (NTSC)
E03020	CAM100 reverse image (PAL)
E03016	CAM50 (NTSC) camera for USA and Canada
E03017	CAM50 (PAL) camera for Europe and ROW
E03018	CAM50 reverse image (NTSC)
E03019	CAM50 reverse image (PAL)
E06017	Camera extension cable – 5m
E06018	Camera extension cable – 15m

GOTO Page 44 for product information

For Detailed Specifications visit **www.raymarine.co.uk**

SeaTalk² Keyboard

GENERAL	SEATALK² KEYBOARD
Power:	
Nominal voltage (volts DC)	powered via SeaTalk²
Power consumption (typical) watts	2W (fully backlit)
Physical:	
Overall dimensions (WxHxD) mm	279x156x107
Product weight kg (lbs)	0.8 (1.8)
Mounting methods	bracket or panel
Connections:	SeaTalk²



KEYBOARD

Ordering Information

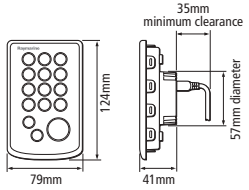
SEATALK² KEYBOARD

E55061	SeaTalk² navigation keyboard

GOTO Page 19 for product information

Alphanumeric Keypad

GENERAL	ALPHANUMERIC KEYPAD
Power:	
Nominal voltage (volts DC)	12V system (powered by SeaTalk)
Absolute voltage range (volts DC)	10 – 16 volts
Power consumption (typical) mA	60mA
Physical:	
Overall dimensions (WxHxD) mm	79x124x41
Mounting methods	flush/surface
Connections:	SeaTalk



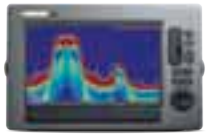
ALPHANUMERIC KEYPAD

Ordering Information

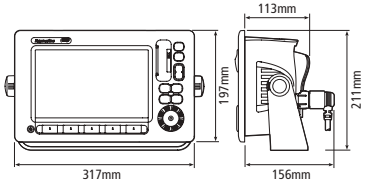
ALPHANUMERIC KEYPAD

E05008	Alphanumeric keypad

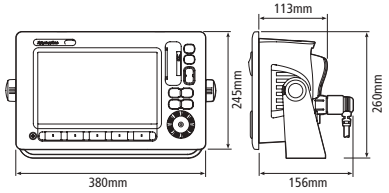
Dual Station Multifunction Displays – Widescreen



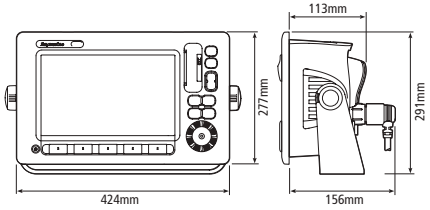
GENERAL	C90W 9" MULTIFUNCTION DISPLAY	C120W 12.1" MULTIFUNCTION DISPLAY	C140W 14.1" MULTIFUNCTION DISPLAY
Power:			
Nominal voltage (volts DC)	12V and 24V systems	12V and 24V systems	12V and 24V systems
Absolute voltage range (volts DC)	10.7 – 32 volts	10.7 – 32 volts	10.7 – 32 volts
Power consumption (typical) watts	19W (full brightness)	22W (full brightness)	32W (full brightness)
Physical:			
Overall dimensions (WxHxD) mm	refer to diagram	refer to diagram	refer to diagram
Product weight kg (lbs)	3.85 (8.5)	4.76 (10.5)	5.58 (12.3)
Mounting methods	flush or bracket (optional)	flush or bracket (optional)	flush or bracket (optional)
Display size and type	229mm (9") colour LCD	307mm (12.1") colour LCD	358mm (14.1") colour LCD
Display resolution	800x480 (wide VGA)	1280x800 (wide XGA)	1280x800 (wide XGA)
Display lighting	sunshine visible/night mode	sunshine visible/night mode	sunshine visible/night mode
Connections:			
SeaTalk*hs*	2	2	2
SeaTalk	1	1	1
SeaTalk*ng*/NMEA 2000	1	1	1
Video input	1 composite video (PAL/NTSC)	1 composite video (PAL/NTSC)	1 composite video (PAL/NTSC)
NMEA input (0183)	3	3	3
NMEA output (0183)	2	2	2
Alarm output	1	1	1
Cartography	embedded Navionics cartography	embedded Navionics cartography	embedded Navionics cartography
GPS	embedded high sensitivity GPS receiver 12 channel SBAS: WAAS/EGNOS compatible	embedded high sensitivity GPS receiver 12 channel SBAS: WAAS/EGNOS compatible	embedded high sensitivity GPS receiver 12 channel SBAS: WAAS/EGNOS compatible



C90W



C120W



C140W

Ordering Information

C SERIES WIDESCREEN	
E62111-US	C90W multifunction display – US
E62111-EU	C90W multifunction display – EU
E62111-RW	C90W multifunction display – RoW
E62113-US	C120W multifunction display – US
E62113-EU	C120W multifunction display – EU
E62113-RW	C120W multifunction display – RoW
E62115-US	C140W multifunction display – US
E62115-EU	C140W multifunction display – EU
E62115-RW	C140W multifunction display – RoW

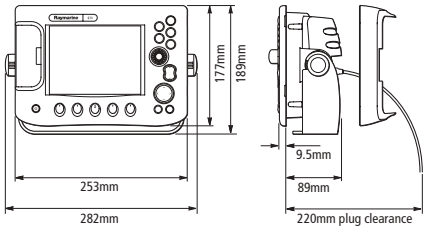
A62132	C90W trunnion mounting kit
A62133	C120W trunnion mounting kit
A62134	C140W trunnion mounting kit

Pages 22 – 29 for product information

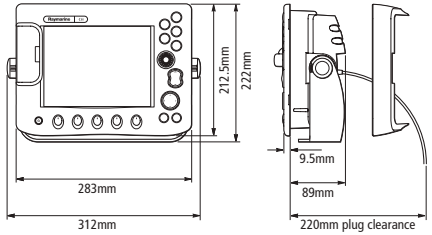
For Cables & Accessories see page 120

Single Station Multifunction Displays

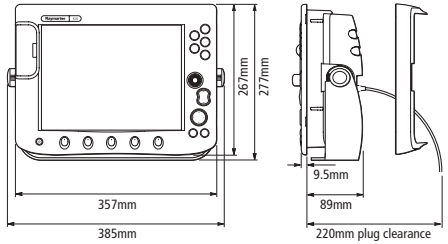
GENERAL	C70 6.5" MULTIFUNCTION DISPLAY	C80 8.4" MULTIFUNCTION DISPLAY	C120 12.1" MULTIFUNCTION DISPLAY
Power:			
Nominal voltage (volts DC)	12V and 24V systems	12V and 24V systems	12V and 24V systems
Absolute voltage range (volts DC)	10.7 – 32 volts	10.7 – 32 volts	10.7 – 32 volts
Power consumption (typical) watts	9W (fully backlit)	10W (fully backlit)	12W (fully backlit)
Physical:			
Overall dimensions (WxHxD) mm	refer to diagram	refer to diagram	refer to diagram
Product weight kg (lbs)	1.2 (2.6)	1.8 (3.9)	3.0 (6.6)
Mounting methods	flush or bracket	flush or bracket	flush or bracket
Display size and type	165mm (6.5") colour TFT LCD	213mm (8.4") colour TFT LCD	307mm (12.1") colour TFT LCD
Display resolution	640x480 (VGA)	640x480 (VGA)	800x600 (SVGA)
Display lighting	64 levels with day/night mode	64 levels with day/night mode	64 levels with day/night mode
Connections:			
NMEA input and output (0183)	✓	✓	✓
SeaTalk	✓	✓	✓
SeaTalk² (NMEA 2000 compatible)	✓	✓	✓
Radar input	✓	✓	✓
Digital sounder module input (hsb²)	DSM30/DSM300	DSM30/DSM300	DSM30/DSM300
PC (RS232) and RayTech interface	via E85001	via E85001	via E85001
Cartography/archiving	Navionics Gold/compact flash cards	Navionics Gold/compact flash cards	Navionics Gold/compact flash cards



C70



C80



C120

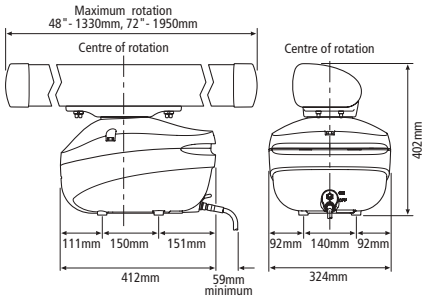
Ordering Information

C SERIES	
E02018	C70 6.5" multifunction display
E02020	C80 8.4" multifunction display
E02022	C120 12.1" multifunction display

GPS FOR USE WITH C SERIES	
E32042	Raystar125 SDGPS receiver

HD & Super HD Digital Open Array Radar Scanners

GENERAL						
Scanner power, size and type	4kW 4' HD open array	4kW 6' HD open array	4kW 4' SHD open array	4kW 6' SHD open array	12kW 4' SHD open array	12kW 6' SHD open array
Power: **(Note Voltage boost box VCM 100 must be used with this product)**						
Nominal voltage (volts DC)	12V, 24V systems	12V, 24V systems	12V, 24V systems	12V, 24V systems	12V, 24V systems	12V, 24V systems
Absolute voltage range (volts DC)	10.8 – 32 volts using VCM100 module	10.8 – 32 volts using VCM100 module	10.8 – 32 volts using VCM100 module	10.8 – 32 volts using VCM100 module	10.8 – 32 volts using VCM100 module	10.8 – 32 volts using VCM100 module
Power consumption (typical) watts	46W	46W	46W	46W	80W	80W
Power consumption (standby) watts	9.2W	9.2W	9.2W	9.2W	9.2W	9.2W
Power save option (timed transmit option)	✓	✓	✓	✓	✓	✓
Physical:						
Overall dimensions (mm) (height with antenna fixed)	pedestal: 412x402 (to top of antenna) antenna length: 1306	pedestal: 412x402 (to top of antenna) antenna length: 1918	pedestal: 412x402 (to top of antenna) antenna length: 1306	pedestal: 412x402 (to top of antenna) antenna length: 1918	pedestal: 412x402 (to top of antenna) antenna length: 1306	pedestal: 412x402 (to top of antenna) antenna length: 1918
Product weight kg	26 (with antenna)	29 (with antenna)	26 (with antenna)	29 (with antenna)	26 (with antenna)	29 (with antenna)
Mounting methods	4 stud	4 stud	4 stud	4 stud	4 stud	4 stud
Scanner cable length	15m standard (5m, 10m & 25m option)	15m standard (5m, 10m & 25m option)	15m standard (5m, 10m & 25m option)	15m standard (5m, 10m & 25m option)	15m standard (5m, 10m & 25m option)	15m standard (5m, 10m & 25m option)
SCANNER FEATURES						
Max range scale	72nm	72nm	72nm	72nm	72nm	72nm
Transmitter frequency	9405 ±20MHz	9405 ±20MHz	9405 ±20MHz	9405 ±20MHz	9405 ±20MHz	9405 ±20MHz
Peak power output	4kW	4kW	4kW	4kW	12kW	12kW
Warm up time	75 seconds	75 seconds	75 seconds	75 seconds	75 seconds	75 seconds
Standby to transmit	2.5 seconds	2.5 seconds	2.5 seconds	2.5 seconds	2.5 seconds	2.5 seconds
Beam width horizontal (3dB max)	1.85°	1.15°	1.85°	1.15°	1.85°	1.15°
Effective beam width with SHD*	n/a	n/a	<1°	<1°	<1°	<1°
Beam width vertical -3dB	25°	25°	25°	25°	25°	25°
Antenna side lobes (inside 10°)	<-21dB	<-21dB	<-21dB	<-21dB	<-21dB	<-21dB
Antenna side lobes (outside 10°)	<-30dB	<-30dB	<-30dB	<-30dB	<-30dB	<-30dB
Rotation rate	24rpm	24rpm	24rpm	24rpm	24rpm	24rpm
Number of displayed video levels	256 (8-bit)	256 (8-bit)	256 (8-bit)	256 (8-bit)	256 (8-bit)	256 (8-bit)
Dual range (independent display of 2 simultaneous ranges)	range A < range B, range A <3nM, range B any	range A < range B, range A <3nM, range B any	range A < range B, range A <3nM, range B any	range A < range B, range A <3nM, range B any	range A < range B, range A <3nM, range B any	range A < range B, range A <3nM, range B any



4' AND 6' OPEN ARRAY

Ordering Information

HD DIGITAL OPEN ARRAYS	
T52071	RA1048D 48" 4kW HD Digital open array
T52074	RA1072D 72" 4kW HD Digital open array

SUPER HD DIGITAL OPEN ARRAYS	
T52085	RA1048SHD 48" 4kW Super HD Digital open array
T52087	RA1072SHD 72" 4kW Super HD Digital open array
T52086	RA3048SHD 48" 12kW Super HD Digital open array
T52088	RA3072SHD 72" 12kW Super HD Digital open array

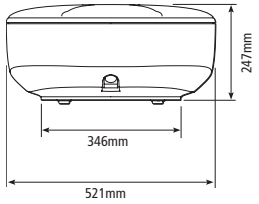
E52091	VCM100 – voltage converter module – spare

CABLES	
A55076	Digital pedestal cable – 5m
A55077	Digital pedestal cable – 10m
A55078	Digital pedestal cable – 15m
A55079	Digital pedestal cable – 25m
A92141	Digital pedestal extension cable – 2.5m
A55080	Digital pedestal extension cable – 5m
A55081	Digital pedestal extension cable – 10m

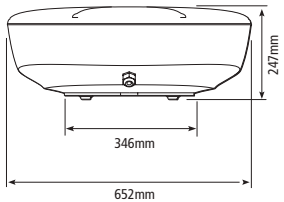
GOTO Pages 33 – 35 for product information

Radome Radar Scanners

GENERAL		
Scanner power, size and type	2kW 18" radome	4kW 24" radome
Power:		
Nominal voltage (volts DC)	12V and 24V systems	12V and 24V systems
Absolute voltage range (volts DC)	10.8 – 32 volts	10.8 – 32 volts
Power consumption (typical) watts	28W	34W
Power consumption (standby) watts	9W	10W
Power save option (timed transmit option)	✓	✓
Physical:		
Overall dimensions (mm)	diameter 521x247	diameter 652x247
Product weight kg (lbs)	9 (19.9)	10 (22.1)
Mounting methods	4 bolts	4 bolts
Scanner cable length	15m standard (5m, 10m & 25m option)	15m standard (5m & 25m option)
SCANNER FEATURES		
Max range scale	24nm	48nm
Transmitter frequency	9410 ±30MHz	9410 ±30MHz
Peak power output	2kW	4kW
Pulse length/PRF	8 (auto/target expand)	8 (auto/target expand)
Warm up time	70 seconds	70 seconds
Standby to transmit	<2.5 seconds	<2.5 seconds
Beam width horizontal -3dB	4.9°	3.9°
Beam width vertical -3dB	25°	25°
Antenna side lobes	<-23dB (outside 10°)	<-23dB (outside 10°)
Rotation rate	24rpm	24rpm
IF frequency	60MHz	60MHz



18" RADOME



24" RADOME

Ordering Information

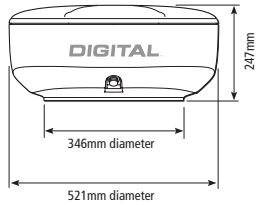
RADOME RADAR SCANNERS	
E52079	RD218 2kW 18" radome
E52080	RD424 4kW 24" radome
E52065	RD218 2kW 18" radome with 15m cable
E52067	RD424 4kW 24" radome with 15m cable

CABLES	
E55067	Right-angled end radome cable (2kW only) – 10m
E55068	Right-angled end radome cable (2kW only) – 15m
M92720	Straight end radome cable (2kW only) – 15m
E55074	Right-angled end radome cable (2kW & 4kW) – 5m
E55065	Right-angled end radome cable (2kW & 4kW) – 15m
E55066	Right-angled end radome cable (2kW & 4kW) – 25m
M92668	Straight end radome cable (2kW & 4kW) – 15m
M92669	Straight end radome cable (2kW & 4kW) – 25m
E55071	90° extension cable – 5m
E55072	90° extension cable – 10m

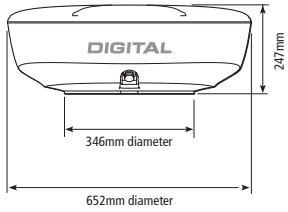
GOTO Pages 33 – 35 for product information

Digital Radome Radar Scanners

GENERAL		
Scanner power, size and type	4kW 18" Digital radome	4kW 24" Digital radome
Power:		
Nominal voltage (volts DC)	12V and 24V systems	12V and 24V systems
Absolute voltage range (volts DC)	10.8 – 32 volts	10.8 – 32 volts
Power consumption (typical) watts	40W	40W
Power consumption (standby) watts	20W	20W
Power save option (timed transmit option)	✓	✓
Physical:		
Overall dimensions (mm)	diameter 521x247	diameter 652x247
Product weight kg (lbs)	9.5 (21)	10 (22.1)
Mounting methods	4 bolts	4 bolts
Scanner cable length	10m standard (5m, 10m & 25m option)	10m standard (5m, 10m & 25m option)
SCANNER FEATURES		
Max range scale	48nm	48nm
Transmitter frequency	9405 ±25MHz	9405 ±25MHz
Peak power output	4kW	4kW
Pulse length/PRF	8 (auto/target expand)	8 (auto/target expand)
Warm up time	70 seconds	70 seconds
Standby to transmit	<2.5 seconds	<2.5 seconds
Beam width horizontal -3dB	4.9°	3.9°
Beam width vertical -3dB	25°	25°
Antenna side lobes	<-23dB (outside 10°)	<-23dB (outside 10°)
Rotation rate	24rpm	24rpm
IF frequency	60MHz	60MHz
Interface	SeaTalk^{hs}	SeaTalk^{hs}



18" DIGITAL RADOME



24" DIGITAL RADOME

Ordering Information

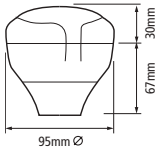
DIGITAL RADOME RADAR SCANNERS	
E92129	RD418D 18" 4kW digital radome with 10m cable
E92130	RD418D 18" 4kW digital radome – no cable
E92131	RD424D 24" 4kW digital radome with 10m cable
E92132	RD424D 24" 4kW digital radome – no cable

CABLES	
A55076	Digital pedestal cable – 5m
A55077	Digital pedestal cable – 10m
A55078	Digital pedestal cable – 15m
A55079	Digital pedestal cable – 25m
A92141	Digital pedestal extension cable – 2.5m
A55080	Digital pedestal extension cable – 5m
A55081	Digital pedestal extension cable – 10m

GOTO Pages 33 – 35 for product information

Raystar125 SDGPS Antenna

GENERAL	RAYSTAR125 (NMEA OR SEATALK OPERATION)
Power:	
Nominal voltage (volts DC)	12V and 24V systems
Absolute voltage range (volts DC)	9 – 32 volts (NMEA version) 9 – 18 volts (SeaTalk version)
Power consumption (typical) watts	1.2W
Physical:	
Overall dimensions (mm)	diameter 95x30
Product weight kg (lbs)	0.13 (0.29)
Mounting methods	flush/pole/rail
Cable length	10m (33')
Connections:	
NMEA input (0183)	NMEA version
NMEA output (0183)	NMEA version
SeaTalk	SeaTalk version
GPS FEATURES	
Type	active antenna
Signal acquisition	12ch. parallel (C/A code)
Satellite differential type	WAAS/EGNOS/MSAS
Differential acquisition	automatic (satellite)
Beacon differential ready	with RTCM input
Position accuracy (RMS)	<15m
Position accuracy with SDGPS (RMS)	<5m
Speed accuracy (RMS)	<0.3kts
Time to first fix from cold start (typical)	<2.5min (<45sec)
Time to first fix (after initial cold start)	typically <8 seconds
Geodetic datum	WGS84 (190 programmable alternatives)



RAYSTAR125

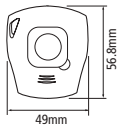
Ordering Information

GPS SENSOR	
E32042	Raystar125 SDGPS sensor

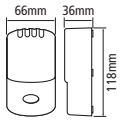
GOTO Page 35 for product information

LifeTag Man Overboard System

GENERAL	
Tag:	
Power	non-rechargeable CR2 3V lithium battery
Transmitted power	1mW
Dimensions (WxHxD) mm	49x56.8x24.4
Max. number of tags per system	16
Base Station:	
Power	8 – 16V DC external supply
Ancilliary switch output rating	200mA at supply voltage
Transmitted power	1mW
Base station range to tag range	typically 9m (30')
Dimensions (WxHxD) mm	66x118x36



LIFETAG



BASE STATION

Ordering Information

LIFETAG	
E12185	LifeTag system – 2 LifeTags, base station and alarm
E15026	Additional LifeTag
A18130	LifeTag base station

GOTO Page 42 for product information

For Cables & Accessories see page 120

RayTech RNS 6.1 Software

GENERAL

Operating system connectivity:	
Windows XP	hsb², SeaTalk^{hs}, NMEA, SeaTalk¹, USB Card Reader
Windows Vista	NMEA, SeaTalk¹, Navionics Multicard Reader

System requirements:	
Processor	Pentium IV or equivalent
RAM memory	512MB minimum
CD Rom drive	✓
Inputs	USB and Ethernet. (Serial & PCMCIA also supported)

Recommended system requirements:	
Processor	Intel Core 2 Duo processor or faster (or equivalent)
Video	NVidia GeForce 4 video card or better (or equivalent)
RAM memory	1GB or higher (2GB or higher Windows Vista)
Operating system	Windows XP

Interfaces:	
NMEA 0183 input/output	via RS232 serial 9 pin data cable
SeaTalk	via RS232 serial data cable through optional E85001 PC/SeaTalk interface
hsb² *	hsb² interface kit required*
SeaTalk^{hs}	10/100 network port required
C-MAP USB C-card reader*	optional**
Navionics USB multi-card reader	optional (included in box)

Cartography supported:	
Navionics Gold/Navionics Platinum	via Navionics Compact Flash reader or SeaTalk^{hs} from E Series
C-Map NT/NT+ C-cards	via C-Map USB card reader** or hsb² interface
C-Map NT/PC/NT+/PC	on CD-ROM installed via C-Map NT+/PC selector (included). Chart licenses purchased separately from C-Map
Raster cartography	BSB formatted nautical, topographical and aerial photo raster cartography: available from MapTech, Softchart, NDI, and others
C-MAP cartography sharing via hsb²	share cartography from C-MAP C-Cards or NT+/PC charts with hsb² Raycharts, hsb² radars, and hsb² echo sounders. Requires hsb² interface kit

Cartography supplied:	
Cartography	Navionics, C-Map offshore sailing charts and NOAA US
Chart layering and merging	control raster and vector chart transparency
Tides and current data	worldwide tides and currents database
Sunrise/sunset predictions	✓
Seamless cartography	raster charts are 'quilted' together
Radar overlay *	requires hsb² kit* or SeaTalk^{hs}
Weather data overlay	free 3 day forecast or advanced weather subscription (7 day forecast)
Head up/north up/course up	SeaTalk or NMEA compass input recommended
Night vision mode	auto/manual
True/magnetic variation source	auto/manual
DataTrak time based graphs	histogram plots of incoming data sources
Polar plots	polar data input and analysis tools

Navigation:	
Waypoints	unlimited
Waypoint name	16 character
Waypoint transfer	via hsb²* or SeaTalk***, NMEA, SeaTalk^{hs}*, C-MAP card reader* or Compact Flash
Routes	unlimited
Route name	16 character
Route optimisation	✓
Waypoints per route	up to 50
Tracks	24 hour continous time period
Points per track	unlimited
Track interval	time intervals
Alarms	✓
Ruler tool	✓
Navigation information	user defined databoxes
Navigation predictions	time to go/estimated time of arrival
GOTO/follow functions	waypoint/cursor/route

Radar: *	
Interface	requires hsb² kit and any hsb² compatible radar system or SeaTalk^{hs} to E Series/G Series
VRM (variable range marker)	2
EBL (electronic bearing line)	2
Gain	auto/manual
Tune	auto/manual
Sea clutter & harbour/offshore mode	auto/manual
Rain clutter	on/off
Interference rejection	on/off
Wakes short,medium,long,off	✓
Target expansion	✓
MARPA	requires heading data
Target tracking	10 targets
Selectable target vectors	✓
Target risk assessment	✓
History plots	✓
Danger alarms	✓
Target data box	✓
Digital radar support	✓

Echo sounder: *	
Interface	requires hsb² kit and hsb² compatible echosounder or echosounder module or SeaTalk^{hs}
HD Digital support	✓
Gain	auto/manual
Range control	auto/manual with shift
Zoom size	auto/manual x2,x4,x6
A-Scope	3 modes
Bottom lock	full/split adjust range
White line	✓
Scroll speed	auto/manual
VRM (variable range marker)	✓

Additional features & display options:	
CDI (course deviation indicator)	3D display
Data boxes	customisable
Radar display and radar/chart overlay*	via hsb² (hsb² interface kit required) or SeaTalk^{hs} (Heading Data Required)
Echo sounder display*	via hsb² (hsb² interface kit required) or SeaTalk^{hs}
Presentation modes	RNS mode, PC Windows or customisable
AIS	via serial port or SeaTalk^{hs}

* *Windows XP only.*
** *Orange C-Card reader will not work with Raytech.*
*** *Available for Pathfinder only.*

For Detailed Specifications visit **www.raymarine.co.uk**

Ordering Information

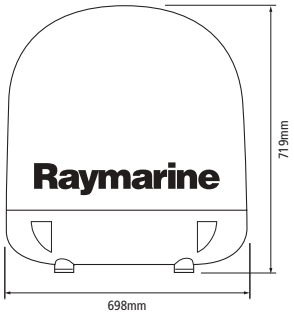
RAYTECH RNS 6.1	
E112111	RayTech RNS 6.1 navigation software
E112112	RayTech RNS 6.1 navigation software upgrade
E112113	RayTech RNS 6.1 planner CD
E86001	PC serial cable
E86026	Navionics card reader
E85001	PC/SeaTalk/NMEA interface box

Microsoft Windows Vista. When installed on a PC with MS Windows Vista, RayTech RNS 6.1 supports route planning and GPS navigation through serial interfaces (NMEA 0183 or SeaTalk) only. RayTech SeaTalk^{hs} (Ethernet) networking is not supported on MS Windows Vista. Visit www.raymarine.com/raytech to learn more.

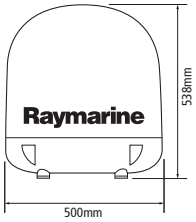
* Networking to SeaTalk^{hs} compatible multi function displays is only compatible with MS Windows XP.

Satellite TV Antenna Systems

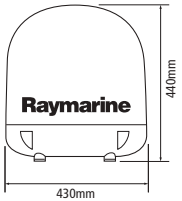
GENERAL	60STV	45STV	37STV
Power:			
Operating voltage	10.8 – 15.6V DC	10.8 – 15.8V DC	10.8 – 15.6V DC
Power consumption	2A (40W typical)	2A (30W typical)	2A (30W typical)
Physical:			
Overall dimensions (WxH) mm	698x719	500x538	430x440
Product weight kg (lbs)	20 (44)	14 (31)	8.6 (18.95)
Antenna dish diameter	600mm	450mm	370mm
PERFORMANCE			
Frequency	ku-band (10.7 – 12.75GHz)	ku-band (10.7 – 12.75GHz)	ku-band (10.7 – 12.75GHz)
Antenna gain	@12.25GHz 36dBi	@12.25GHz 33dBi	32dBi
Minimum EIRP (effective isotropic radiated power)	47dBW	50dBW	50dBW
Azimuth range	680°	680°	680°
Elevation range	5° to 90°	0° to 90°	+10° to +80°
Roll & pitch range	roll ±25°/pitch ±15°	roll ±25°/pitch ±15°	roll ±25°/pitch ±15°
Roll & pitch tracking	45°/second	50°/second	60°/second
Turn rate	45°/second	50°/second	60°/second
Position repeatability	0.2° step acc. max	1.7° max pointing accuracy	1.7° max pointing accuracy
Shock	27G, 11msec	27G, 11msec	27G, 11msec
LNB	universal quad LNB – Europe and Middle East dual LNB – Australia, China and New Zealand	dual output	dual output
Vibration	1G over 6 – 350Hz (60 sweeps)	1G over 6 – 350Hz (60 sweeps)	1G over 6 – 350Hz (60 sweeps)



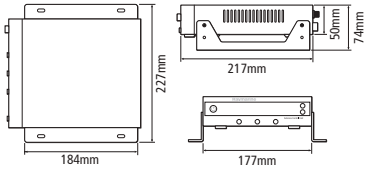
60STV ANTENNA



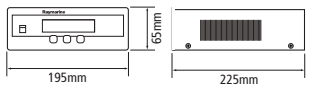
45STV ANTENNA



37STV ANTENNA



37STV ANTENNA CONTROL UNIT



60STV/45STV ANTENNA CONTROL UNIT

Ordering Information

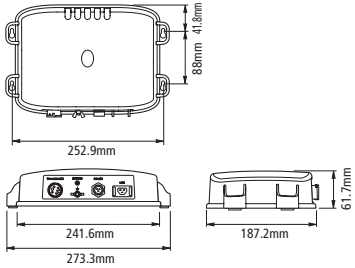
60STV	
E93007	60STV satellite television antenna – standard European version
E93008	60STV satellite television antenna – premium European version
E93011	60STV satellite television antenna – Australia, China and New Zealand version
E93012	60STV satellite television antenna – Middle East version
45STV	
E93003	45STV satellite television antenna – European version
E93004	45STV satellite television antenna – Australia, China and New Zealand version
E93013-V	45STV satellite televison antenna – HD system pack
37STV	
E93018	37STV satellite television antenna – European version
E42128	37STV satellite television antenna – Australia, China and New Zealand version
ACCESSORIES	
E96013	60STV empty dome/base plate
E96009	45STV empty dome/base plate
E96016	37STV empty dome/base plate
E96006	45STV power cable to ACU – 30m
E96007	45STV cable ACU to antenna – 30m
R08135	RF cable – 15m
E96008	RF cable – 30m

Pages 36 – 37 for product information

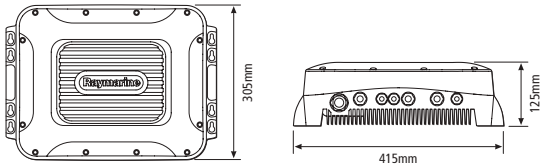
For Cables & Accessories see page 120

HD Digital Echo Sounder Modules

GENERAL	DSM30	DSM300	DSM400
Power:			
Nominal voltage (volts DC)	12V system only	12V and 24V systems	12V and 24V systems
Absolute voltage range (volts DC)	10.7 – 18 volts	10.7 – 32 volts	10.7 – 32 volts
Power consumption (typical)	0.5A (8A peak)	0.5A (8A peak)	1.5A (6A peak) dual frequency operation
Nominal output power (RMS)	600W	1000W	up to 3000W @ 28 – 50kHz up to 2000W @ 185 – 200kHz
Frequency(s) (transducer dependent)	200/50kHz	200/50kHz	200/185/50/38/28kHz
Physical:			
Dimensions (WxHxD) mm	273x62x187	273x62x187	416x125x307
Product weight kg (lbs)	1.0 (2.2)	1.0 (2.2)	12.25 (27)
Mounting methods	4 keyhole mounting tabs bulkhead	4 keyhole mounting tabs bulkhead	8 keyhole mounting tabs (mount below deck but NOT in engine compartment)
Connections:			
hsb² input/output	✓	✓	✗
SeaTalk^{hs}	✓	✓	✓



DSM30 AND DSM300



DSM400

Ordering Information

HD DIGITAL FISHFINDER MODULE	
E63069	DSM300 digital sounder module
E63072	DSM400 digital sounder module
E63074	DSM30 digital sounder module

* *SeaTalk^{hs}/hsb² cables for connection to E Series and C Series displays sold separately.*

HD Digital Fishfinder Transducer Options

Part Number	Housing	Type	Data	Power	Material	DSM400	DSM300	DSM30	DSM25	Fibreglass Hull	Metal Hull	Wooden Hull	Compatible with an In-board Engine
A102115	IH	R299	D	3kW	CU	●				●**			●
A102117	IH	R399	D	3kW	CU	●				●**			●
E66013	TH LP	P319	D	600W	P		●	●	●*	●	●		●
E66014	TH LP	B117	D	600W	B		●	●	●*	●		●	●
E66015	TH LP	SS555	D	600W	SS		●	●	●*	●	●	●	●
E66008	IH	P79	D	600W	P		●	●	●*	●**			●
E66073	IH	P74	D	600W	P				●	●**			●
E66076	IH	R199	D	1kW	CR		●			●**			●
A66089	IH	M260	D	1kW	CU		●			●**			●
A102112	TH LP	B164-20	DT	1kW	B		●			●		●	●
A102113	TH LP	B164-12	DT	1kW	B		●			●		●	●
A102114	TH	R209	DT	3kW	CU	●				●	●	●	●
A102116	TH	R309	DT	3kW	CU	●				●	●	●	●
A102118	TH	SS270W	DT	1kW	SS	●				●	●	●	●
A102121	TH	SS270W	DT	1kW	SS		●			●	●	●	●
A102122	TH	SS260	DT	1kW	SS		●			●	●	●	●
A102140	TM	P48	DT	600W	P				●	●	●	●	
E66084	TM	M258	DT	1kW	P		●			●	●	●	
E66075	TH	R99	DT	1	CR		●			●	●	●	●
E66079	TH	B260	DT	1	B		●			●		●	●
E66082	TH	B258	DT	1	B		●			●		●	●
E66085	TH LP	B60-20	DT	600W	B		●	●		●		●	●
E66086	TH LP	B60-12	DT	600W	B		●	●		●		●	●
E66087	TH LP	B60-20	DT	600W	B				●	●		●	●
E66088	TH LP	B60-12	DT	600W	B				●	●		●	●
E66054	TM	P66	DST	600W	P		●	●		●	●	●	
E66062	TM	P58	DST	600W	P				●	●	●	●	
A66090	TH	B744V	DST	600W	B				●	●		●	●
A66091	TH	B744V	DST	600W	B		●	●		●		●	●
A66092	TH	B744VL	DST	600W	B		●	●	●*	●		●	●
A102120	TH LP	T42	T	n/a	B	●				●		●	●
A102119	TH LP	CS4500	ST	n/a	B	●				●		●	●
E66019	TM	ST69	ST	n/a	P		●	●		●	●	●	
E66071	TH LP	P120	ST	n/a	P		●	●		●	●		●
E66072	TH LP	B120	ST	n/a	B		●	●		●		●	●

Transducer Table Key

V: Valve
L: Long Stem
TM: Transom Mount
TH: Through Hull
LP: Low Profile
B: Bronze P: Plastic
SS: Stainless Steel
CR: Cast Resin
CU: Cast Urethane
ST: Speed and Temperature
DST: Depth / Speed / Temperature
DT: Depth / Temperature
D: Depth
IH: In Hull
T: Temperature

* Adaptor cable required (part number E66066

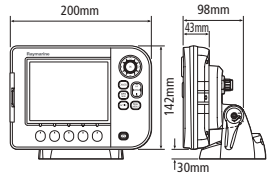
** Must not be Cored Fiberglass hull (foam, balsa wood or plywood layers sandwiched between an inner and outer skin)

GOTO Pages 38 – 41 for product information

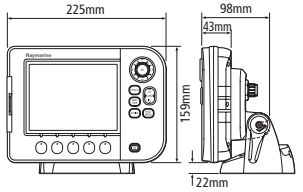
For Cables & Accessories see page 120

Chartplotter/Chartplotter Fishfinders

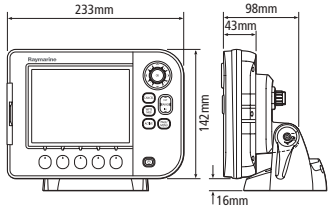
GENERAL	A50 / A50D	A57D	A70 / A70D
Power:			
Supply	external 10.7 – 18V DC required, 13.8V DC nominal floating earth/fully isolated	external 10.7 – 18V DC required, 13.8V DC nominal floating earth/fully isolated	external 10.7 – 18V DC required, 13.8V DC nominal floating earth/fully isolated
Power consumption	6 – 8W	6 – 8W	6 – 8W
Power consumption (sonar operation)	18W peak	18W peak	18W peak
Physical:			
Dimensions (WxHxD) mm	200x142x43	227x159x43	233x171x43
Weight kg (lbs)	1.36 (3.0) bracket mounted	1.46 (3.2) bracket mounted	1.50 (3.3) bracket mounted
Display type	Colour TFT LCD	Colour TFT LCD	Colour TFT LCD
Display resolution	640 x 480 pixels (VGA)	640 x 480 pixels (VGA)	640 x 480 pixels (VGA)
Display size	127mm (5")	144mm (5.7")	162mm (6.4")
Illumination	screen and keypad	screen and keypad	screen and keypad
Connections:	NMEA 0183 input (x2)		
	NMEA 0183 output (x2)		
	Selectable to 4800, 4800 Navtex, 9600 Navtex or 38,400 AIS		
	SeaTalk*ng*		
	sonar/transducer (7 way connector)		
	Compact Flash slot		
Interfaces:			
NMEA 0183 interface	2 input and output ports		
NMEA 0183 input messages	GLL, GGA, GLC, GSA, GSV, GTD, VTG, BWC, BWR, RMA, RMB, RMC, XTE, VHW, HDG, HDM, HDT, DBT, DPT, APB, VLW, MTW, MWV, WPL, RTE, DSC and ZDA. Selectable to 4800, 4800 Navtex, 9600 Navtex or 38,400 AIS		
NMEA 0183 output messages - user selectable	APB, BWC, BWR, DBT, DPT, GGA, GLL, MTW, RMA, RMB, RMC, RTE, VLW, VHW, VTG, WPL and ZDA		
SeaTalk*ng* / NMEA2000	1 SeaTalk*ng* connector. SeaTalk*ng* to NMEA2000 adaptor available		
DISPLAY CHAPTERS AND PAGES			
Languages	English (US), English (UK), Italian, French, Spanish, German, Norwegian, Dutch, Swedish, Danish, Portuguese, Finnish, Icelandic, Chinese, Russian, Greek, Japanese, Korean		
System Alarms	alarm clock, anchor, arrival, deep depth, MOB, offtrack, shallow depth, temperature, timer		
Navigation alarms	arrival, offtrack and XTE		
Data pages	5		
Data available	vessel position, active waypoint, TTG, VMG – waypoint, depth, COG, SOG, heading, speed, set/drift, trip log, ground log, ground trip, rudder, local time and date, sea temperature, app wind, true wind, VMG wind, ground wind XTE, compass, locked heading, wa		
Engine pages	5		
Engine data	tacho, boost pressure, alternator, oil pressure, coolant temperature, engine hours, fuel level (tanks 1 & 2), fuel rate, total fuel, load, trim tab, engine trim & genset		



A50 / A50D



A57



A70 / A70D

Ordering Information

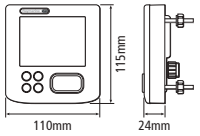
A SERIES	
E62184-EU	A50 – 5" chartplotter – EU
E62184-RW	A50 – 5" chartplotter – RoW
E62186-EU	A50D – 5" chartplotter/fishfinder – EU
E62186-RW	A50D – 5" chartplotter/fishfinder – RoW
E62188-EU	A57D – 5.7" chartplotter/fishfinder – EU
E62188-RW	A57D – 5.7" chartplotter/fishfinder – RoW
E62190-EU	A70 – 6.4" chartplotter – EU
E62190-RW	A70 – 6.4" chartplotter – RoW
E62192-EU	A70D – 6.4" chartplotter/fishfinder – EU
E62192-RW	A70D – 6.4" chartplotter/fishfinder – RoW
A62154	A50, A57, A70 flush mount kit

For Detailed Specifications visit **www.raymarine.co.uk**

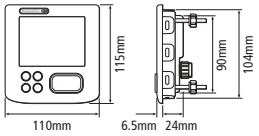
GOTO Pages 46 – 49 for product information

ST70 Instruments

GENERAL	ST70 MULTIFUNCTION INSTRUMENT	ST70 AUTOPILOT CONTROL HEAD
Power:		
Absolute voltage range (volts DC)	9 – 16 volts	9 – 16 volts
Power consumption (typical) mA	220mA	220mA
Physical:		
Overall dimensions (WxHxD) mm	110x115x24	110x115x24
Product weight kg (lbs)	0.27 (0.6)	0.27 (0.6)
Mounting method	low profile flush or surface mount	low profile flush or surface mount
Control type	4 buttons plus multi directional trackpad	4 buttons plus multi directional trackpad
Display size and type	89 mm (3.5") sunlight viewable QVGA (320x240 pixels) Colour Transflective TFT	89 mm (3.5") sunlight viewable QVGA (320x240 pixels) Colour Transflective TFT
Colour palettes	day and night modes	day and night modes
Display lighting	white LED, sliding scale	white LED, sliding scale
Connections:		
Connectors	2 SeaTalk^{ng} connectors	2 SeaTalk^{ng} connectors
Interfaces	SeaTalk^{ng}, NMEA 2000, SeaTalk, SeaTalk^{2}	SeaTalk^{ng}, NMEA 2000, SeaTalk, SeaTalk^{2}
DISPLAY CHAPTERS AND PAGES		
Languages	UK English, US English, Spanish, French, German, Dutch, Italian,Swedish, Danish, Norwegian	UK English, US English, Spanish, French, German, Dutch, Italian, Swedish, Danish, Norwegian
User instrument page options	8	3
User page layout options	16	display/compass rose/isometric
Depth	depth; depth Log; minimum depth; maximum depth	
Speed	VMG to waypoint; VMG to waypoint log; speed; speed Log; maximum speed; average speed; VMG windward; log; trip; local time and date	
Wind	AWS; AWA; TWS; TWA; GWD; Beaufort; cardinal; wind speed log; wind direction log; AWS maximum; AWA maximum; TWA maximum; TWA minimum; TWS maximum; TWS minimum	
Compass	heading; heading log; locked heading: tack heading; average heading	
Navigation	BTW, XTE, ETA; TTG, CMG; DMG; DMG and CMG, DTW	
GPS	COG, SOG, COG Graph, SOG Graph, COG and SOG; Lat and Long; satellites; satellites and HDOP	
Engine	engine RPM; fuel flow; fuel level; engine hours: fuel economy; average fuel rate, coolant temperature	
Battery	battery voltage; battery amps, battery temperature, unit voltage graph	
Engine	oil pressure; oil temperature; boost pressure; battery temperature; coolant pressure; trim position	
Environment	sea temperature; barometric pressure; barometric pressure log; sunset & sunrise; maximum sea temperature: minimum sea temperature; sea temperature graph, set and drift; air temperature; air temperature log; maximum air temperature; minimum air temperature, apparent wind chill, true wind chill, dew point, humidity (requires Airmar weather transducer)	
Alarms	depth, wind, speed, temperature, off course, battery volts, last fix, waypoint arrival, MOB	



SURFACE



FLUSH

Ordering Information

ST70	
E22105	ST70 colour instrument display
E12196	ST70 colour autopilot display
A25062	SeaTalk^{ng} backbone interconnection kit
E22106	ST70 depth transducer pod
E22107	ST70 speed transducer pod
E22108	ST70 wind transducer pod

ST70 Cables	
A06028	SeaTalk^{ng} T-piece
A06030	SeaTalk^{ng} extender
A06031	SeaTalk^{ng} backbone terminator
A06033	SeaTalk^{ng} backbone cable – 400mm
A06034	SeaTalk^{ng} backbone cable – 1m
A06035	SeaTalk^{ng} backbone cable – 3m
A06036	SeaTalk^{ng} backbone cable – 5m
A06037	SeaTalk^{ng} backbone cable – 20m
A06038	SeaTalk^{ng} spur cable – 400mm
A06039	SeaTalk^{ng} spur cable – 1m
A06040	SeaTalk^{ng} spur cable – 3m
A06041	SeaTalk^{ng} spur cable – 5m
A06042	SeaTalk^{ng} elbow spur cable – 400mm
A06045	Devicenet adaptor cable – female
A06046	Devicenet adaptor cable – male
A06047	SeaTalk adaptor cable – 3-pin
A06049	SeaTalk^{ng} power cable
A06064	SeaTalk^{ng} 5 way connector
A06032	Blanking plug
A06043	Spur to stripped end cable – 1m
A06044	Spur to stripped end cable – 3m
A06048	SeaTalk^{2} adaptor cable – 5 pin
A06061	E Series to SeaTalk^{ng} adaptor cable
A06062	SeaTalk^{2} to cable – female
A25063	SeaTalk^{ng} terminator

ST70 Accessories	
R28198	ST70 suncover
R28199	ST70 mounting bracket
A22123	ST60+ to ST70 bracket adaptor

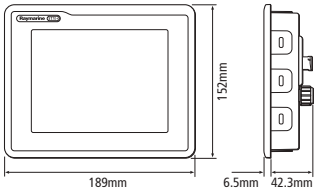
ST70 Smart Transducers	
A22111	DST800-0 depth/speed/temperature
A22112	DT800-12 depth/temperature

Pages 53 – 55 for product information

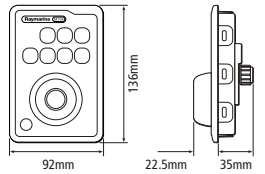
For Cables & Accessories see page 120

ST70+ Instruments

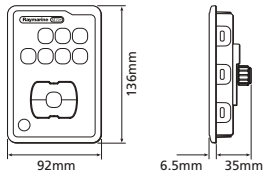
GENERAL	ST70+ MULTIFUNCTION INSTRUMENT	KEYPADS
Power:		
Absolute voltage range (volts DC)	9 – 16 volts	9 – 16 volts
Power consumption (maximum) mA	700mA	100mA
Physical:		
Overall dimensions (WxHxD) mm	189x152x66.5 (Includes bend allowance for power cable)	136x92x56 (Power Pilot/Instrument) / 136x92x42 (Sail Pilot) (Does NOT include any allowance for SeaTalk^{ng})
Product weight kg (lbs)	0.9 (1.98)	0.3 (0.66)
Mounting method	low profile flush or surface mount (fully sealed behind panel mount)	low profile flush or surface mount
Control type	dedicated keypad	backlit buttons & rotary control (Power Pilot/Instrument) / backlit buttons (Sail Pilot)
Display size and type	165 mm (6.5") sunlight viewable VGA (640x480 pixels) colour LCD	
Colour palettes	inverse video (white text on black background) night mode (red text on black background)	
Display lighting	white LED, sliding scale	
Connections:		
Connectors	2 SeaTalk^{ng} connectors, 1 Power connector	2 SeaTalk^{ng} connectors
Interfaces	SeaTalk^{ng}, NMEA 2000	SeaTalk^{ng}, NMEA 2000
DISPLAY CHAPTERS AND PAGES		
Languages	UK English, US English, Spanish, French, German, Dutch, Italian,Swedish, Danish, Norwegian, Portuguese, Russian, Finnish, Greek, Chinese, Korean, Japanese	
User instrument page options	8	
User page layout options	17	
Depth	depth; depth Log; minimum depth; maximum depth	
Speed	VMG to waypoint; VMG to waypoint log; speed; speed Log; maximum speed; average speed; VMG windward; log; trip; local time and date	
Wind	AWS; AWA; TWS; TWA; GWD; Beaufort; cardinal; wind speed log; wind direction log; AWS maximum; AWA maximum; TWA maximum; TWA minimum; TWS maximum; TWS minimum	
Compass	heading; heading log; locked heading: tack heading; average heading	
Navigation	BTW, XTE, ETA; TTG, CMG; DMG; DMG and CMG, DTW	
GPS	COG, SOG, COG Graph, SOG Graph, COG and SOG; Lat and Long; satellites; satellites and HDOP	
Engine	engine RPM; fuel flow; fuel level; engine hours: fuel economy; average fuel rate, coolant temperature	
Battery	battery voltage; battery amps, battery temperature, unit voltage graph	
Engine	oil pressure; oil temperature; boost pressure; battery temperature; coolant pressure; trim position	
Environment	sea temperature; barometric pressure; barometric pressure log; sunset & sunrise; maximum sea temperature: minimum sea temperature; sea temperature graph, set and drift; air temperature; air temperature log; maximum air temperature; minimum air temperature, apparent wind chill, true wind chill, dew point, humidity (requires Airmar weather transducer)	
Alarms	depth, wind, speed, temperature, off course, battery volts, last fix, waypoint arrival, MOB	
Display	Bennett and Lenco trim tabs, scalable rudderbar	



ST70+ INSTRUMENT DISPLAY



ST70+ POWER PILOT/INSTRUMENT KEYPAD



ST70+ SAIL PILOT KEYPAD

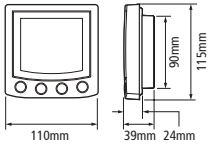
Ordering Information

ST70 +	
E22115	ST70+ Display
E22116	ST70+ Instrument Keypad
E22117	ST70+ Sail Keypad
E22118	ST70+ Power Keypad
E22119	C/H VGM Analogue Repeater
E22121	Compass Analogue Repeater
E22122	RFU Analogue Repeater
E22123	Wind Analogue Repeater

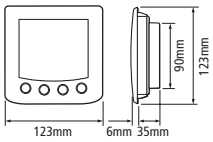
ST60+ Instruments

GENERAL	SPEED	DEPTH	WIND AND CH WIND	COMPASS
Power:				
Nominal voltage (volts DC)	12V system	12V system	12V system	12V system
Absolute voltage range (volts DC)	10 – 16 volts	10 – 16 volts	10 – 16 volts	10 – 16 volts
Power consumption (typical) mA	45mA	45mA	65mA	65mA
Physical:				
Overall dimensions (WxHxD) mm (standard bezel)	110x115x39	110x115x39	110x115x39	110x115x39
Mounting methods	flush/surface/bracket	flush/surface/bracket	flush/surface/bracket	flush/surface/bracket
Control type(s)	4 backlit buttons	4 backlit buttons	4 backlit buttons	4 backlit buttons
Display size and type	92mm segmented LCD	92mm segmented LCD	34mm segmented LCD & pointer	34mm segmented LCD & pointer
Maximum character size	36mm	36mm	13mm	13mm
Display lighting	3 levels plus off	3 levels plus off	3 levels plus off	3 levels plus off
Connections:				
NMEA input and output (0183)	option via E85001	option via E85001	option via E85001	option via E85001
SeaTalk	2 connections	2 connections	2 connections	2 connections
PC (RS232) and RayTech interface option (via E85001)	✓	✓	✓	✓
DISPLAY OPTIONS				
Low power indication	✗	✗	✗	✗
Adjustable display response time	✓	✓	LCD and pointer	LCD and pointer
System option supplied with transducer	✓	✓	✓	✓
Clip on bezel option	flush mount	flush mount	flush mount	flush mount

GENERAL	RUDDER ANGLE	TRIDATA	GRAPHIC REPEATER
Power:			
Nominal voltage (volts DC)	12V system	12V system	12V system
Absolute voltage range (volts DC)	10 – 16 volts	10 – 16 volts	10 – 16 volts
Power consumption (typical) mA	45mA	45mA	50mA
Physical:			
Overall dimensions (WxHxD) mm (standard bezel)	110x115x39	110x115x39	110x115x39
Mounting methods	flush/surface/bracket	flush/surface/bracket	flush/surface/bracket
Control type(s)	4 backlit buttons	4 backlit buttons	4 backlit buttons
Display size and type	✗	92mm segmented LCD	92mm dot matrix
Maximum character size	✗	19mm	36mm
Display lighting	3 levels plus off	3 levels plus off	3 levels plus off
Connections:			
NMEA input and output (0183)	option via E85001	option via E85001	✓
SeaTalk	2	2	2
PC (RS232) and RayTech interface option (via E85001)	✓	✓	✓
DISPLAY OPTIONS			
Low power indication	✗	✗	battery volts and alarm
Adjustable display response time	pointer	✓	✓
System option supplied with transducer	✓	✓	✗
Clip on bezel option	flush mount	flush mount	flush mount



SURFACE



FLUSH

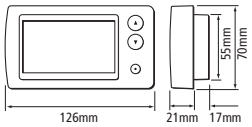
Ordering Information

ST60+	
A22004-P	ST60+ tridata display – digital
A22013-P	ST60+ tridata system – digital
A22017-P	ST60+ tridata repeater – digital
A22002-P	ST60+ depth display – digital
A22010-P	ST60+ depth system w/transducer – digital
A22001-P	ST60+ speed display – digital
A22009-P	ST60+ speed system w/transducer – digital
A22005-P	ST60+ wind display – analogue
A22011-P	ST60+ wind system analogue rotavector – power
A22012-P	ST60+ wind system analogue vane – power/sail
E22049-P	ST60+ clubhouse wind display
A22016-P	ST60+ clubhouse wind analogue system
E22075-P	ST60+ graphic display
A22006-P	ST60+ CH/VMG repeater display – analogue
A22007-P	ST60+ compass display – analogue
A22014-P	ST60+ compass system – analogue
A22008-P	ST60+ rudder angle indicator display – analogue
A22015-P	ST60+ rudder angle indicator system – analogue

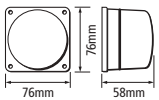
GOTO Pages 61 – 62 for product information

ST40 Instruments

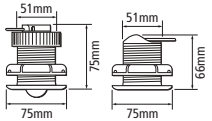
GENERAL	SPEED	DEPTH	WIND	COMPASS	BIDATA
Power:					
Nominal voltage (volts DC)	12V system	12V system	12V system	12V system	12V system
Absolute voltage range (volts DC)	10 – 16 volts	10 – 16 volts	10 – 16 volts	10 – 16 volts	10 – 16 volts
Power consumption (typical) mA	25mA	30mA	25mA	20mA	35mA
Physical:					
Overall dimensions (WxHxD) mm	126x70x38	126x70x38	126x70x38	126x70x38	126x70x38
Mounting methods	surface or bracket	surface or bracket	surface or bracket	surface or bracket	surface or bracket
Control type(s)	3 backlit buttons	3 backlit buttons	3 backlit buttons	3 backlit buttons	3 backlit buttons
Display size and type	88mm segmented LCD	88mm segmented LCD	88mm segmented LCD	88mm segmented LCD	88mm segmented LCD
Maximum character size	28mm	28mm	17mm	17mm	28mm
Display lighting	3 levels plus off	3 levels plus off	3 levels plus off	3 levels plus off	3 levels plus off
Connections:					
NMEA input and output (0183)	option via E85001	option via E85001	option via E85001	option via E85001	option via E85001
SeaTalk	✓	✓	✓	✓	✓
DISPLAY OPTIONS					
Low power indication	✓	✓	✓	✓	✓
Adjustable display response time	✓	✓	✓	✓	✓
System option supplied with transducer	✓	✓	✓	✓	✓
Replace boat speedo					✗



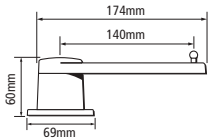
ST40 INSTRUMENT HEAD



FLUXGATE COMPASS TRANSDUCER
(SUPPLIED WITH 8 METRE / 26' CABLE)



ST40 LOW PROFILE SPEED AND DEPTH TRANSDUCERS
(SUPPLIED WITH 9 METRE / 30' CABLE)



RUDDER REFERENCE
(SUPPLIED WITH 10 METRE / 33' CABLE)

Ordering Information

ST40 INSTRUMENT SYSTEMS	
E22043	ST40 speed through-hull system supplied with E26008 low profile speed transducer (cable length 9m/30')
E22044	ST40 depth through-hull system supplied with E26009 low profile depth transducer (cable length 9m/30')
E22045	ST40 bidata system supplied with E26008 & E26009 transducers (cable length 9m/30')
E22047	ST40 wind system with Z195 rotavecta wind transducer (cable length 20m/65')
E22048	ST40 compass system supplied with M81190 fluxgate compass transducer (cable length 8m/26')
E22052	ST40 speed transom mount system supplied with E26005 transducer (cable length 9m/30')
E22053	ST40 depth transom mount system supplied with E26007 transducer (cable length 9m/30')
E22054	ST40 bidata transom mount system supplied with E26006 transducer (cable length 9m/30')

ST40 INSTRUMENT DISPLAYS	
E22037	ST40 speed display
E22038	ST40 depth display
E22041	ST40 wind display
E22042	ST40 compass display
E22039	ST40 bidata display

For Cables & Accessories see page 120

For Detailed Specifications visit **www.raymarine.co.uk**

GOTO Page 63 for product information

ST290 Instruments

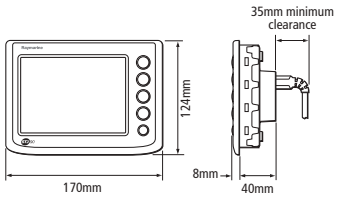
GENERAL	GRAPHIC DISPLAY	DATA DISPLAY
Power:		
Nominal voltage (volts DC)	12V system	12V system
Absolute voltage range (volts DC)	10 – 16 volts	10 – 16 volts
Power consumption (typical) mA	75mA (illumination off)	75mA (illumination off)
Physical:		
Overall dimensions (WxHxD) mm	170x124x46	170x124x46
Mounting methods	flush/surface	flush/surface
Control type(s)	5 backlit buttons	5 backlit buttons
Display size and type	140mm dot matrix LCD	140mm segmented LCD
Maximum character size	48mm	25mm
Display lighting	3 levels plus off	3 levels plus off
Connections:		
NMEA input (0183)	via DPU	via DPU
NMEA output (0183)	via DPU	via DPU
SeaTalk	via DPU	via DPU
SeaTalk^2 in/out (NMEA 2000 via DPU)	2	2
PC (RS232) and RayTech interface option (via E85001)	via DPU	via DPU
SYSTEM OPTIONS		
Man over board (MOB) keypad option	✓	✓
Extra loud external alarm	via DPU	via DPU
Compatible remote keypad options	remote	remote
Compatible autopilot keypad option	✓	✓
Custom data via RayTech	✓	✗

GENERAL	ANALOGUE WIND	ANALOGUE CH WIND	ANALOGUE COMPASS	ANALOGUE RUDDER
Power:				
Nominal voltage (volts DC)	12V system	12V system	12V system	12V system
Absolute voltage range (volts DC)	10 – 15 volts	10 – 15 volts	10 – 15 volts	10 – 15 volts
Power consumption (typical) mA	65mA (illumination off)	65mA (illumination off)	65mA (illumination off)	65mA (illumination off)
Physical:				
Overall dimensions (WxHxD) mm	124x124x39	124x124x39	124x124x39	124x124x39
Mounting methods	flush/surface	flush/surface	flush/surface	flush/surface
Control type(s)	4 backlit buttons	4 backlit buttons	4 backlit buttons	4 backlit buttons
Display size and type	34mm segmented LCD	34mm segmented LCD	34mm segmented LCD	✗
Maximum character size	13mm	13mm	13mm	✗
Display lighting	3 levels plus off	3 levels plus off	3 levels plus off	3 levels plus off
Connections:				
SeaTalk	2 ports	2 ports	2 ports	2 ports

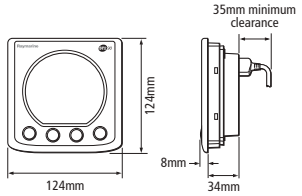
Pages 64 – 65 for product information

For Cables & Accessories see page 120

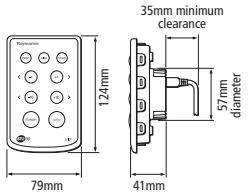
For Detailed Specifications visit **www.raymarine.co.uk**



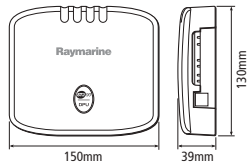
GRAPHIC AND DATA DISPLAY



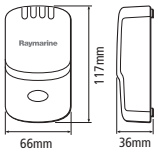
ANALOGUE WIND, CLOSE HAULED WIND, COMPASS AND RUDDER DISPLAYS



KEYPAD



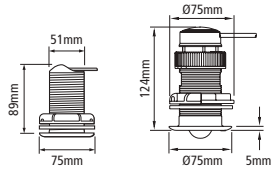
DATA PROCESSING UNIT (DPU) AND SMART HEADING SENSOR



TRANSDUCER POD

ST290 Instruments

GENERAL	REMOTE MOB PILOT KEYPADS	DATA PROCESSING UNIT	TRANSDUCER PODS (SPEED, DEPTH, WIND)	SMART HEADING SENSOR
Power:				
Nominal voltage (volts DC)	12V system	12V system	12V system	12V and 24V systems
Absolute voltage range (volts DC)	10 – 16 volts	10 – 16 volts	10 – 16 volts	10 – 32 volts
Power consumption (typical) mA	65mA (remote) 47mA (MOB) 58mA (pilot)	250mA	50mA	130mA
Physical:				
Overall dimensions (WxHxD) mm	78.5x124x41	150x130x39	66x117x36	150x130x39
Mounting methods	flush/surface	surface	surface	surface
Control type(s)	backlit buttons	✗	✗	x2 status LED
Connections:				
NMEA input (0183)	✗	✓	✗	✗
NMEA output (0183)	✗	✓	via DPU	✓
SeaTalk	2	✓	✗	✓
SeaTalk² in/out (NMEA 2000 via DPU)	via DPU	✓	2 (NMEA 2000 only)	✗
PC (RS232) and RayTech interface option (via E85001)	✗	✓	✗	✓
SYSTEM OPTIONS				
Man over board (MOB) keypad option	MOB keypad only	✗	✗	✗
Extra loud external alarm	via DPU	✓	✗	✗
Compatible remote keypad options	standard product	✓	✗	✗
Compatible autopilot keypad option	standard product	✓	✗	✗



SPEED AND DEPTH TRANSDUCERS
ST60+ AND ST290 (TYPICAL)

GOTO Pages 64 – 65 for product information

Ordering Information

ST290 SYSTEM PACK	
T22071	Comprises: graphic display, data processing unit (DPU), speed pod, depth pod, system manual. Note: compatible speed/depth transducer must be ordered separately.

ST290 DISPLAYS	
E22056	ST290 data display
E22057	ST290 graphic display
E22059	ST290 wind angle analogue display
E22060	ST290 compass analogue display
E22061	ST290 CH wind analogue display
E22062	ST290 rudder angle analogue display

ST290 KEYPADS	
E12094	ST290 pilot keypad (button)
E22063	ST290 digital remote keypad
E22064	ST290 MOB keypad

ST290 TRANSDUCERS	
E12102	Smart heading sensor compass transducer
E22068	Active wind transducer system
E15022	Rudder reference (potted) & tropica bracket
E22067	ST290 active depth pod
E22069	ST290 active speed pod

Instrument Transducer Selection Guide

Part Number	Housing	Type	Data	Material	ST40	ST60+	ST70	ST290	Fibreglass Hull	Metal Hull	Wooden Hull	Compatible with an Inboard Engine	Cable Length – Metres (ft)
E26027-PZ	TM	P66	D	P	●	●	●	●	●	●	●		9 (30)
E26001-PZ	IH	P79	D	P	●	●	●	●	●**			●	14 (45)
E26019-PZ	TH	B45	D	B	●	●	●	●	●		●	●	14 (45)
E25026-PZ	TH LP	P19	D	P		●	●	●	●	●		●	20 (65)
E26009	TH LP	P7 Shorty	D	P	●	●	●	●	●	●		●	9 (30)
M78713-PZ	TH LP	P19	D	P		●	●	●	●	●		●	14 (45)
E26030	TH LP Ret.	D800/P17	D	P	●	●	●	●	●	●		●	14 (45)
M78717	TH LP Ret.	B17	D	B	●	●	●	●	●		●	●	14 (45)
E26028-PZ	TM	P66	DST	P		●	●	●	●	●	●		14 (45)
E26006-PZ	TM	P65	DST	P	●				●	●	●		8 (30)
A26043	TH	B744V	DST	B	●	●	●	●	●		●	●	14 (45)
A26044	TH	B744VL	DST	B	●	●	●	●	●		●	●	14 (45)
A22111	TH LP	DST800-0	DST	P			●		●	●		●	3 (9.5)
A22112	TH LP	DT800-12	DT	P			●		●	●		●	3 (9.5)
E26005	TM	ST69	ST	P	●	●	●	●	●	●	●		8 (30)
E26024	TH LP	CS4500	ST	P	●	●	●	●	●	●		●	10 (33)
E26008	TH LP	ST300/P371	ST	P	●	●	●	●	●	●		●	9 (30)
E25025	TH LP Ret.	P17	ST	P		●	●	●	●	●		●	20 (65)
M78716	TH LP Ret.	ST600/B120	ST	B	●	●	●	●	●		●	●	14 (45)
E26031	TH LP Ret.	ST800/P120	ST	P		●	●	●	●	●		●	14 (45)

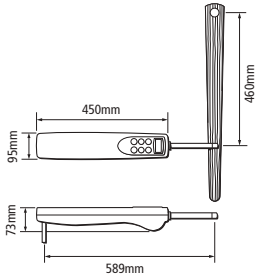
** Must not be Cored Fiberglass hull (foam, balsa wood or plywood layers sandwiched between an inner and outer skin).

Transducer key

V: Valve L: Long Stem TM: Transom Mount TH: Through Hull
TH LP Ret: Through Hull Low Profile Retractable LP: Low Profile B: Bronze P: Plastic
SS: Stainless Steel CR: Cast Resin CU: Cast Urethane ST: Speed / Temperature
DST: Depth / Speed / Temperature DT: Depth / Temperature D: Depth IH: In Hull.

Tiller Pilots

GENERAL	ST1000 TILLER PILOTS	ST2000 TILLER PILOTS
Power:		
Nominal voltage (volts DC)	12V system	12V system
Absolute voltage range (volts DC)	10 – 16 volts	10 – 16 volts
Current consumption (standby) mA	40mA	40mA
Physical:		
Overall dimensions (WxHxD) mm	450x73x95	450x73x95
Product weight kg (lbs)	1.53 (3.4)	1.53 (3.4)
Mounting methods	reversible port or starboard	reversible port or starboard
Control type(s)	6 buttons	6 buttons
Display size and type	45mm segmented LCD	45mm segmented LCD
Maximum character size	9mm	9mm
Display lighting	3 levels plus off	3 levels plus off
Connections:		
NMEA input (0183)	✓	✓
SeaTalk	✓	✓
ADDITIONAL FEATURES		
Predefined data displays	3 pages	3 pages
Customisable data displays	✗	✗
Repeat instrument and navigation data on pilot		
Man over board (MOB) repeater	✗	✗
DRIVE OPTIONS		
Standard drive	integral (drive/display/compass)	integral (drive/display/compass)
Optional drives	✗	✗
Thrust kg (lbs)/torque Nm (lb.in.)	57kg (125lbs)	77kg (169lbs)
Stroke/revs per minute/peak flow rate	254mm (10")	254mm (10")
Max. recommended laden boat displacement	3000kg (6600lbs)	4500kg (10000lbs)
SYSTEM OPTIONS		
Remote control option	✓	✓
Multiple control displays	✓	✓
Extra loud external alarm – via E85001	✓	✓
Autopilot status repeated on instruments	✓	✓
External compass	optional	optional
Rate gyro stabilised compass	optional	optional
Rudder reference option	✗	✗



ST1000 AND ST2000 TILLERPILOT

Ordering Information

TILLERPILOTS	
A12004	ST1000 tillerpilot
A12005	ST2000 tillerpilot

Page 70 for product information

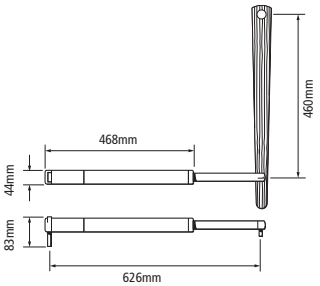
For Cables & Accessories see page 120

SPX-5 Tiller, Wheel Drive and Sport Drive Pilots

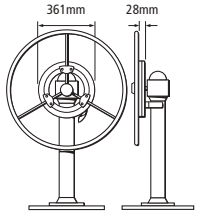
GENERAL	SPX-5 TILLER PILOT	SPX-5 WHEEL PILOT	SPX-5 SPORTPILOT
Power:			
Nominal voltage (volts DC)	12V system	12V system	12V system
Absolute voltage range (volts DC)	10 – 16 volts	10 – 16 volts	10 – 16 volts
Current consumption (standby) mA	250mA	250mA	250mA
Connections:			
NMEA input (0183) and output	1	1	1
SeaTalk	2	2	2
SeaTalk*ng*	1	1	1
DRIVE OPTIONS			
Standard drive	tiller	wheel	max torque 15Nm
Optional drives	GP tiller	✗	
Thrust kg (lbs)/torque Nm (lb.in.)	84kg (185lbs) GP: 84kg (185lbs)	30Nm ✗	
Stroke/revs per minute/peak flow rate	254mm (10")	9rpm	
Max. recommended laden boat displacement	6000kg (13,000lbs) GP: 7500kg (16,500lbs)	7500kg (16,500lbs)	mechanical: 2000kg (4400lbs) hydraulic: 3200kg (7000lbs)

Ordering Information

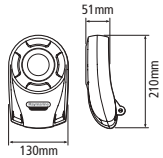
SPX-5	
E12201	SPX-5 SmartPilot wheel
E12202	SPX-5 SmartPilot sport
E12203	SPX-5 SmartPilot tiller plus
E12204	SPX-5 SmartPilot tiller GP
E12133	SPX-5 SmartPilot wheel – no control head
E12132	SPX-5 SmartPilot sport – no control head
E12137	SPX-5 SmartPilot tiller plus – no control head
E12138	SPX-5 SmartPilot tiller GP – no control head



SPX-5 TILLERPILOT



SPX-5 WHEELPILOT



SPX-5 SPORTPILOT

Selecting the Right Autopilot Drive Unit

Drive Units

Identify the correct drive unit type* for your boat (refer to the table on pages 73 – 75), then use the following information to identify the correct model.

* *We recommend that a Raymarine approved dealer confirms your selection and carries out the installation and commissioning. Approved installations carry a FULL 2 YEAR WORLDWIDE WARRANTY.*

For more information contact your national distributor (see outside back cover for details) or consult ***www.raymarine.co.uk***

Pages 73 – 75 for product information

For Cables & Accessories see page 120

For Detailed Specifications visit **www.raymarine.co.uk**

Type 1 and 2 Rotary Drive

BOAT LADEN DISPLACEMENT (MAXIMUM):
Type 1: 10,000kg (22,000lb)
Type 2: 20,000kg (44,000lb)

PEAK OUTPUT TORQUE:
Type 1: 20Nm (180lb.in)
Type 2: 34Nm (300lb.in)

MAXIMUM SHAFT SPEED:
33rpm

SPROCKETS:

M81182	13T sprocket
M81183	15T sprocket
M81185	19T sprocket
M81186	25T sprocket

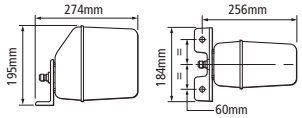
DRIVE UNIT PART NUMBERS:

M81135	Type 1 (12V)
M81136	Type 2 (12V)
M81137	Type 2 (24V)

Type 1 Drive - SmartPilot S1/S2/S3/SPX-10 Course Computers

Type 2 Drive - SmartPilot S3/SPX-30 (12v/24v) Course Computers

All 24V Drives - use SmartPilot S3/SPX-10/SPX-30 Course Computers



TYPE 1 AND 2 ROTARY DRIVE

Standard and Universal Sterndrive

Universal Sterndrive shown.

DRIVE:
Electromechanical for power-assisted sterndrive systems.
Not all sterndrive systems are supported.

MAXIMUM THRUST:
150kg (330lb) Standard sterndrive
80kg (175lb) Universal sterndrive

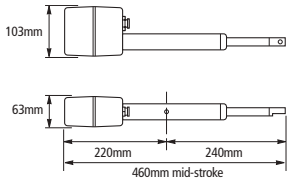
HARDOVER TIME:
8.8secs

STROKE:
214mm (8.3in)

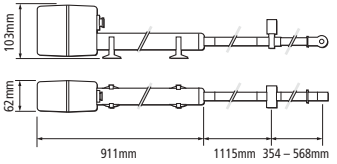
DRIVE UNIT PART NUMBERS:

M81138	Standard sterndrive
E12026	Universal sterndrive

Type IO Drive - SmartPilot S1/S2/S3/SPX-10 Course Computers



STANDARD STERNDRIVE



UNIVERSAL STERNDRIVE

Type 1 and 2 Linear Drive

BOAT LADEN DISPLACEMENT (MAXIMUM):
Type 1: 10,000kg (22,000lb) Type 2S: 15,000kg (33,000lb),
Type 2L: 20,000kg (44,000lb)

PEAK THRUST:
Type 1: 295kg (650lb), Type 2S/Type 2L: 480kg (1050lb)

STROKE:
Type 1/Type 2S: 300mm (12in), Type 2L: 400mm (16in)

HARDOVER TIME (NO LOAD):
Type 1/Type 2S: 11secs, Type 2L: 14secs

RUDDER TORQUE (MAXIMUM):
Type 1: 735Nm (6500lb.in), Type 2S: 1190Nm (10,500lb.in),
Type 2L: 1660Nm (14,700lb.in)

DRIVE UNIT PART NUMBERS:

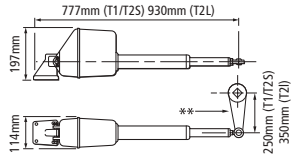
M81130	Type 1 (12V)
M81131	Type 2S (Short) (12V)
M81132	Type 2L (Long) (12V)
M81133	Type 2S (Short) (24V)
M81134	Type 2L (Long) (24V)

Type 1 Drive - SmartPilot S1/S2/S3/SPX-10 Course Computers

Type 2 Drive - SmartPilot S3/SPX-30 Course Computers

All 24V Drives - use SmartPilot S3/SPX-10/SPX-30 Course Computers

** Includes G version SmartPilot.*



TYPE 1 AND 2 LINEAR DRIVE
** NOT SUPPLIED (CONTACT STEERING MANUFACTURER)

Type 1, 2 and 3 Hydraulic Pumps

BOAT STEERING RAM CAPACITY:
Type 1: 4.9in³ – 14in³ (80cc – 230cc)
Type 2: 14in³ – 21in³ (230cc – 350cc)
Type 3: 21in³ – 30.5in³ (350cc – 500cc)
E12139: 3.1in³ – 6.7in³ (50cc – 110cc)

MAXIMUM STALL PRESSURE AT 12V:
Type 1: 750psi (50bar)
Type 2: 1450psi (100bar)
Type 3: 1160psi (80bar)
E12139: 750psi (50bar)

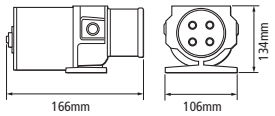
PEAK FLOW RATE (NO LOAD):
Type 1: 67in³/min (1000cc/min)
Type 2: 122in³/min (2000cc/min)
Type 3: 175in³/min (2900cc/min)
E12139: 39in³/min (650cc/min)

DRIVE UNIT PART NUMBERS:	
M81120	Type 1 (12V)
M81119	Type 1 (24V)
M81121	Type 2 (12V)
M81123	Type 2 (24V)
M81122	Type 3 (12V)
M81124	Type 3 (24V)

Type 1 (12v) Drive - SmartPilot S1/S2/S3/SPX-10 Course Computers

Type 1 (24v) Drive - SmartPilot S3/SPX-10 Course Computers

Type 2/3 (12v/24v) Drive - SmartPilot S3/SPX-30 Course Computers



TYPE 1, 2 AND 3 HYDRAULIC (TYPICAL SIZE SHOWN)

Type 2 and 3 Hydraulic Linear Drive

BOAT LADEN DISPLACEMENT (MAXIMUM):
Type 2: 22,000kg (48,500lb), Type 3: 35,000kg (77,000lb)

PEAK THRUST:
Type 2: 585kg (1290lb, Type 3: 1000kg (2200lb)

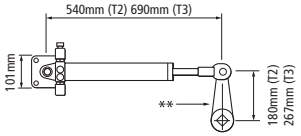
MAXIMUM STROKE:
Type 2: 254mm (10in), Type 3: 300mm (12in)

HARDOVER (NO LOAD):
Type 2: 10secs, Type 3: 12secs

MAXIMUM RUDDER TORQUE:
Type 2: 1270Nm (11,300lb.in)
Type 3: 2565Nm (23,100lb.in)

DRIVE UNIT PART NUMBERS:	
M81200	Type 2 (12V)
M81201	Type 2 (24V)
M81202	Type 3 (12V)
M81203	Type 3 (24V)

Suitable for SmartPilot S3/SPX-30 Corepacks only.



TYPE 2 AND 3 HYDRAULIC LINEAR
** NOT SUPPLIED (CONTACT STEERING MANUFACTURER)

Constant Running Pumps

CONSTANT RUNNING PUMP PART NUMBERS:	
E12171	12v CR pump 3.0 to 4.5L
E12172	24v CR pump 3.0 to 4.5L

Contact product support for information

Selecting the Right Autopilot Drive Unit

Course Computer

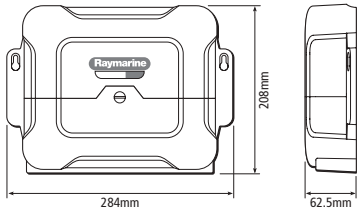
Rotary Rudder Refererence

Fluxgate Compass

SPX Smartpilot Course Computers

GENERAL	SMARTPILOT SPX-10 COURSE COMPUTER	SMARTPILOT SPX-30 COURSE COMPUTER	SMARTPILOT SPX-SOL COURSE COMPUTER	SMARTPILOT SPX-CAN COURSE COMPUTER
Power:				
Nominal voltage (volts DC)	12V and 24V systems	12V and 24V systems	12V and 24V systems	12V and 24V systems
Absolute voltage range (volts DC)	10.5 – 32 volts	10 – 32 volts	10 – 32 volts	10 – 32 volts
Current consumption (standby) mA	300mA	300mA	300mA	300mA
Fuse protection	15A	40A	15A	10A
Physical:				
Overall dimensions (WxHxD) mm	307x195x70	307x195x70	307x195x70	307x195x70
Product weight kg (lbs)	2.2 (4.85)	2.2 (4.85)	2.2 (4.85)	2.2 (4.85)
Mounting methods	bulkhead	bulkhead	bulkhead	bulkhead
Connections:				
Inputs	fluxgate compass, rudder position sensor, NMEA 0183, SeaTalk, SeaTalk*ng*, power, sleep switch	fluxgate compass, rudder position sensor, NMEA 0183, SeaTalk, SeaTalk*ng*, power, sleep switch	fluxgate compass, rudder position sensor, NMEA 0183, SeaTalk, SeaTalk*ng*, power, sleep switch	fluxgate compass, rudder position sensor, NMEA 0183, SeaTalk, SeaTalk*ng*, power, sleep switch, CAN, command acknowledge
Outputs	NMEA 0183, SeaTalk, SeaTalk*ng*, drive motor, drive clutch	NMEA 0183, SeaTalk, SeaTalk*ng*, drive motor, drive clutch	NMEA 0183, SeaTalk, SeaTalk*ng*, bypass valve, solenoid drive	NMEA 0183, SeaTalk, SeaTalk*ng*
ADDITIONAL FEATURES				
Advanced steering technology (AST)	✓	✓	✓	✓
AutoLearn	✓	✓	✓	✓
Fast heading output for MARPA and overlay	5Hz when supplied through 0183 10Hz when supplied through SeaTalk*ng*	5/10Hz	5/10Hz	5/10Hz
DRIVE OPTIONS	*all type 1 drives/pumps (excluding CR pumps)	*all type 1, 2 and 3 drives 12v/24v	solenoid only	CAN systems
SYSTEM OPTIONS				
Remote control option	✓	✓	✓	✓
Multiple control displays	✓	✓	✓	✓
External alarm – via E85001	✓	✓	✓	✓
External compass	standard in corepack	standard in corepack	standard in corepack	standard in corepack
Rudder reference	not required	standard in corepack	standard in corepack	not required

* *Drive voltage must match boat's supply voltage*



SPX SMARTPILOT COURSE COMPUTERS

Ordering Information

SPX SMARTPILOT COURSE COMPUTERS	
E12198	SPX-10 SmartPilot corepack
E12199	SPX-30 SmartPilot corepack
E12200	SPX-CAN SmartPilot corepack
E12205	SPX-SOL SmartPilot corepack

GOTO Pages 76 – 77 for product information

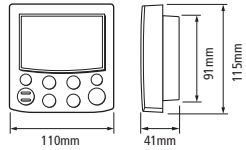
For Detailed Specifications visit **www.raymarine.co.uk**

For Cables & Accessories see page 120

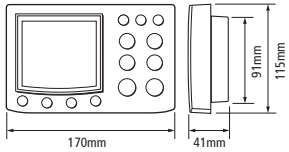
Autopilot Control Heads

GENERAL	ST6002 PILOT CONTROL HEAD	ST7002 PILOT CONTROL HEAD	ST8002 ROTARY PILOT CONTROL HEAD	ST70 AUTOPILOT CONTROL HEAD
Power:				
Nominal voltage (volts DC)	12V system	12V system	12V system	12V system
Absolute voltage range (volts DC)	10 – 16 volts	10 – 16 volts	10 – 16 volts	9 – 16 volts
Current consumption (full backlights) mA	200mA	120mA	120mA	220mA
Current consumption (standby) mA	60mA	50mA	50mA	
Physical:				
Overall dimensions (WxHxD) mm	110x115x30	170x115x41	170x115x41	110x115x24
Product weight kg (lbs)	0.36 (0.8)	0.45 (1.0)	0.45 (1.0)	0.27 (0.6)
Mounting methods	surface/flush	surface/flush	surface/flush	low profile flush or surface mount
Control type(s)	8 backlit buttons	13 backlit buttons	9 backlit buttons & 1 rotary	4 buttons plus multi directional trackpad
Display size and type	86mm segmented LCD	98mm segmented LCD	98mm segmented LCD	89 mm (3.5") sunlight viewable QVGA (320x240 pixels) Colour Transflective TFT
Maximum character size	18mm	30mm	30mm	
Colour palettes				day and night modes
Display lighting	3 levels plus off	3 levels plus off	3 levels plus off	white LED, sliding scale
Connections:				
NMEA input (0183)	✓	✓	✓	
NMEA output (0183)	via all course computers	via all course computers	via all course computers	
SeaTalk		2	2	
Connectors				2 SeaTalk^{ng} connectors
Interfaces	2			SeaTalk^{ng}, NMEA 2000, SeaTalk, SeaTalk^{2}
ADDITIONAL FEATURES				
Predefined data displays	3 pages	3 pages	3 pages	
Customisable data displays	15 pages	15 pages	15 pages	
Repeat instrument and navigation data on pilot	✓	✓	✓	
Man over board (MOB) repeater	✓	✓	✓	
Advanced steering technology (AST)	✓	✓	✓	
AutoLearn	✓	✓	✓	
Fast heading output for MARPA and overlay	✓	✓	✓	
Languages				UK English, US English, Spanish, French, German, Dutch, Italian, Swedish, Danish, Norwegian
User instrument page options				3
User page layout options				display/compass rose/isometric
PROCESSOR (COURSE COMPUTER) OPTIONS				
Standard autopilot	SmartPilot-S1/S2/S3	SmartPilot-S1/S2/S3	SmartPilot-S1/S2/S3	
Autopilot with rate gyro	with SmartPilot-S1G/S2G/S3G	with SmartPilot-S1G/S2G/S3G	with SmartPilot-S1G/S2G/S3G	
DRIVE OPTIONS				
Standard drive	any Raymarine drive option	any Raymarine drive option	any Raymarine drive option	
SYSTEM OPTIONS				
Remote control option	✓	✓	✓	
Multiple control displays	✓	✓	✓	
Extra loud external alarm	✓	✓	✓	
Autopilot status repeated on instruments	✓	✓	✓	

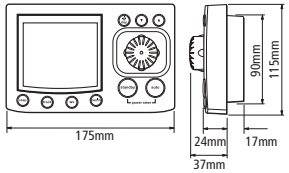
Autotack is not an option on the ST8002



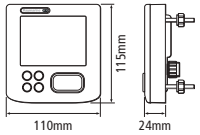
ST6002 CONTROL UNIT



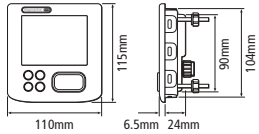
ST7002 CONTROL UNIT



ST8002 CONTROL UNIT



ST70 SURFACE



ST70 FLUSH

GOTO Page 79 for product information

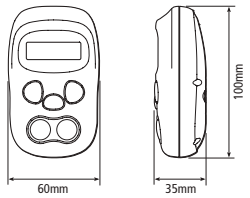
Wireless Autopilot Remotes

GENERAL	S100 WIRELESS AUTOPILOT REMOTE	SMARTCONTROLLER
Power:		
Nominal voltage (volts DC)	12V system	12V system
Absolute voltage range	10 – 16 volts	10 – 16 volts
Battery	2 x AAA	rechargeable NiMH
Physical:		
Overall dimensions (WxHxD) mm	60x100x35	59x148x40
Product weight kg (lbs)	0.06 (0.13)	0.16 (0.35)
Mounting methods	cradle, lanyard and belt clip	cradle, lanyard and belt clip
Control type	5 buttons	8 buttons
Display size and type	9 x 35mm dot matrix LCD	25 x 35mm dot matrix LCD
Maximum character size	8mm	16mm
Display lighting	on/off	on/off
SeaTalk	via RF	via RF/wired
RF transmitter & receiver	✓	✓
KEY FEATURES		
Steer to GPS	✓	✓
Steer to navigation info	waypoint or route	waypoint or route/steer to wind/auto tack
Rudder gain	✓	✓
Rudder damping	✓	✓
Response	✓	✓
Repeats other SeaTalk data	✓	✓

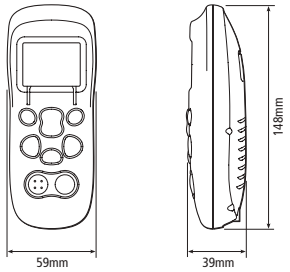
GENERAL	BASE STATION
Power:	
Nominal voltage (volts DC)	12V system
Absolute voltage range	10 – 16 volts
Physical:	
Overall dimensions (WxHxD) mm	66x117x36
Product weight kg (lbs)	0.1 (0.22)
Mounting methods	surface
NMEA input (0183)	via E85001
NMEA output (0183)	via E85001
SeaTalk connection	1
RF transmitter & receiver	✓

Ordering Information

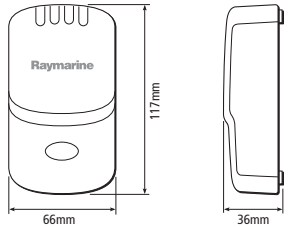
WIRELESS AUTOPILOT REMOTES	
E15024	S100 wireless autopilot remote with base station
E15023	SmartController wireless autopilot remote and instrument repeater with base station



S100 WIRELESS AUTOPILOT REMOTE



SMARTCONTROLLER



BASE STATION

Pages 82 – 83 for product information

For Cables & Accessories see page 120

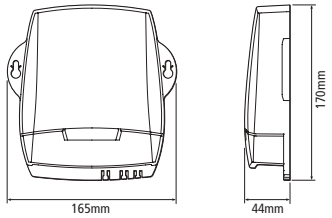
S1000 Inboard Autopilot with Wireless Remote

for Hydraulic Systems

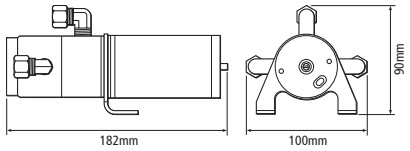
GENERAL	S1000 COURSE COMPUTER
Power:	
Nominal voltage (volts DC)	12V system
Absolute voltage range (volts DC)	10 – 16 volts
Physical:	
Overall dimensions (LxWxD) mm	165x170x44
Course computer weight kg (lbs)	0.4 (0.88)
Mounting methods	surface
NMEA input connections (0183)	1
NMEA output connections (0183)	1
SeaTalk connections	1
RF transmitter & receiver	✓
ADDITIONAL FEATURES	
SmartSteer	✓
Fishing patterns	inc. cloverleaf, zigzag, circle
Processor options	
Autopilot	S1000
Drive options	
Standard drive	S1000 pump
System options	
Remote	✓
Multiple control displays	✓
Extra loud external alarm	✓
Pilot status repeats on instruments	✓
S1000 Fit Guide (Typical)	
Vessel type and size	typically up to 25'
Steering type	balanced hydraulic
Steering ram capacity	80 – 200cc
Peak flow rate	800cc/min

Ordering Information

AUTOPILOT WITH WIRELESS REMOTE	
E12169	SmartPilot S1000 wireless autopilot system

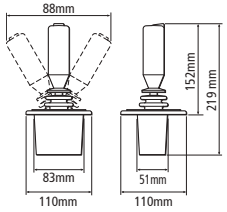


S1000 COURSE COMPUTER

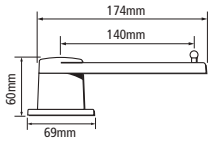


S1000 PUMP

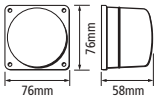
Smartpilot Systems



SEATALK JOYSTICK CONTROL



RUDDER REFERENCE
(SUPPLIED WITH 10 METRE / 33' CABLE)



FLUXGATE COMPASS TRANSDUCER
(SUPPLIED WITH 8 METRE / 26' CABLE)

Ordering Information

SMARTPILOT SYSTEMS

Complete modular inboard autpilot systems consist of a control head, corepack and drive unit

E12106	S1 hydraulic type 1 inboard (rotary rudder feedback unit) with ST6002 control head
E12120	S1G hydraulic type 1 inboard (rotary rudder feedback unit) with ST6002 control head
E12107	S1 hydraulic type 1 outboard (linear rudder feedback unit) with ST6002 control head
E12122	S1G hydraulic type 1 outboard (linear rudder feedback unit) with ST6002 control head
E12108	S1 linear drive wth ST6002 control head
E12124	S1G linear drive with ST6002 control head
E12116	S1 hydraulic type 1 inboard (rotary rudder feedback unit) with ST8002 control head
E12121	S1G hydraulic type 1 inboard (rotary rudder feedback unit) with ST8002 control head
E12117	S1 hydraulic type 1 outboard (linear rudder feedback unit) withST8002 control head
E12123	S1G hydraulic type 1 outboard (linear rudder feedback unit) with ST8002 control head
E12118	S1 linear drive wth ST8002 control head
E12125	S1G linear drive with ST8002 control head
E12151	SmartPilot S1 (ST6002) out – R/R
E12152	SmartPilot S1G (ST6002) out – R/R
E12153	SmartPilot S1 (ST8002) out – R/R
E12154	SmartPilot S1G (ST8002) out – R/R

CONTROL HEADS

E12098-P	ST6002 control head, surface mount
E12100-P	ST6002 control head, flush mount
E12099-P	ST7002 control head, surface mount
E12182	ST7002 control head, flush mount
E12119-P	ST8002 rotary control head, surface mount
E12183	ST8002 rotary control head, flush mount
E22105	ST70 colour control head

SUNCOVERS

A25004	ST6002 suncover
A15001	ST7002 suncover
A18097	ST8002 suncover

JOYSTICK CONTROL

E12136	SeaTalk joystick control
A18096	SeaTalk joystick interface box only

SMART HEADING SENSOR, RATE GYRO COMPASS

E12101	Rate gyro processor unit
E12102	Pathfinder smart heading rate gyro system includes fluxgate compass

COMPASS TRANSDUCER

M81190	Fluxgate compass wih spade contacts supplied with 8m/26' cable

RUDDER REFERENCE TRANSDUCER

M81105	Rudder reference, supplied with 10m/33' cable

CORE PACKS*

E12114	SmartPilot S1 12V corepack
E12115	SmartPilot S1G 12V high performance corepack with built in gyro
E12054	SmartPilot S2 12V corepack
E12091	SmartPilot S2G 12V high performance corepack with built in gyro
E12055	SmartPilot S3 12/24V corepack
E12092	SmartPilot S3G 12/24V high performance corepack with built-in gyro

* ***Corepacks include:*** *course computer and fluxgate compass. SPX-30 and SPX-SOL also contain a rotary rudder reference transducer for further performance.*

SPX SMARTPILOT SYSTEMS

E12197	SPX-5 SmartPilot corepack
E12201	SPX-5 SmartPilot wheel
E12202	SPX-5 SmartPilot sport
E12203	SPX-5 SmartPilot tiller plus
E12204	SPX-5 SmartPilot tiller GP

SPX CORE PACKS

E12198	SPX-10 SmartPilot corepack
E12199	SPX-30 SmartPilot corepack
E12200	SPX-CAN SmartPilot corepack
E12205	SPX-SOL SmartPilot corepack

Pages 66 – 83 for product information

For Detailed Specifications visit **www.raymarine.co.uk**

For Cables & Accessories see page 120

Ray240E Class D-DSC VHF Radio

GENERAL	
Power:	
Nominal voltage (volts DC)	12V system
Absolute voltage range (volts DC)	10.8 – 15.6 volts
Power consumption (typical) amps	standby 220mA RX 600mA TX @ 1.5W = 1.5A TX @ 25W = 5.5A
Physical:	
Primary handset	**full function handset - E45010**
Overall dimensions (WxHxD) mm	59x170x31
Product weight kg (lbs)	0.38 (0.84)
Mounting methods	cradle/hand held
Control type(s)	11 dedicated keys, plus full alpha numeric keypad
Distress button	under sliding cover
Display size and type	45mm LCD
Display lighting	3 levels and off
Base Transceiver unit:	**remote base station - R49131**
Overall dimensions (WxHxD) mm	273x178x67
Product weight kg (lbs)	1.4 (3.12)
Mounting methods	surface
Ancillary items (1)	**powered loudspeaker - E45003**
Overall dimensions (WxHxD) mm	124x124x60
Product weight kg (lbs)	0.42 (0.93)
Mounting methods	flush/surface
Control type(s)	rotary volume knob
Ancillary items (2)	**hailer horn (see Ray430)**
Connections:	
NMEA (0183) input and output	✓
SeaTalk	✓
SYSTEM OPTIONS	
External powered loud speaker	supplied as standard
Interface with GPS	via SeaTalk or NMEA
Multi-station option	up to 2 handsets
Intercom between handsets	✓

Ordering Information

RAY240E	
E42002	Ray240E fixed mount VHF
E45002	Ray240E 2nd station
E45003	Ray240E power loudspeaker

RAY240E ACCESSORIES	
E45010	Ray240E handset only
E45011	Ray240E extension cable – 3m
E45012	Ray240E extension cable – 5m
E45013	Ray240E extension cable – 10m
E45014	Ray240E bulkhead mounting kit

GOTO Pages 85 – 86 for product information

Ray218E VHF Radio

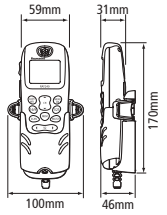
GENERAL	
Power	12V DC system (13.6V DC, typical)
Frequency range	transmit: 156.050 to 157.425MHz, receive: 156.050 to 163.275MHz
Mounting	bracket or flush mount
Display size and type	82mm (3.2") LCD
Transceiver weight kg (lbs)	1.59 (3.5)
Waterproofing standard	IPX7
Connections:	
NMEA IN sentences supported (NMEA 0183 ver 3.01)	GLL, GGA, RMA, RMC, GNS, GNSS
NMEA OUT sentences (NMEA 0183 ver 3.01)	DSC, DSE
TRANSMITTER	
RF power (at 13.6 VDC): hi mode, lo mode	25W, 1W
Maximum deviation	±5KHz
FM hum and noise level	<-40dB below audio level
Adjacent channel power	<70dB
Spurious/harmonic emissions	<-70dBc
Current drain: hi power at 13.6V DC	<6A
RECEIVER	
Sensitivity @ 12dB SINAD	0.28 µV, typical
Hum and noise	<-40dB below audio level
Audio distortion	<10%
Adjacent channel rejection	>80dB, typical
Inter modulation rejection ratio	>80dB, typical
Spurious image rejection	>80dB, typical
Squelch Sensitivity	@ tight - <1µV, @ threshold - <0.28µV
Loudhailer option	**loudhailer – M95435**
Loudhailer output power	30W @ 4 ohms
Loudhailer horn impedance	4 ohms

Ordering Information

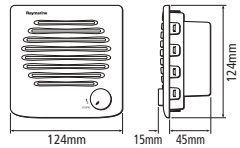
RAY218E	
E43033	Ray218E VHF radio
E43033-UK	Ray218E VHF radio – UK

RAY218E ACCESSORIES	
A46052	RayMic second station
A46053	Rear flush mount kit
A46054	Mic relocation kit – 5m
A46055	RayMic extension cable – 5m
A46056	RayMic extension cable – 10m
M95435	Hailing horn speaker
A46060	Front mount kit

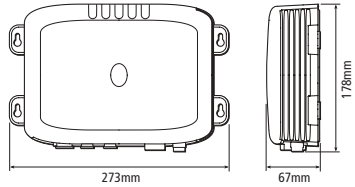
GOTO Pages 86 – 87 for product information



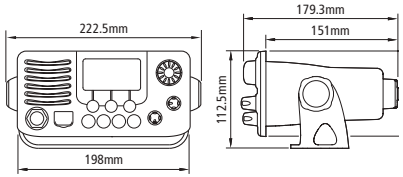
RAY240E HANDSET
(SHOWN IN CRADLE)



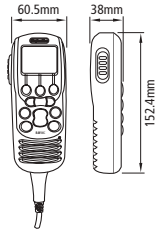
RAY240E SPEAKER



RAY240E BASE



RAY218E



RAYMIC SECOND STATION

Ray49E, Ray55E VHF Radios

GENERAL	RAY49E	RAY55E
Power	12V DC system (13.6V DC, typical)	12V DC system (13.6V DC, typical)
Audio output power	3.5W	5W into 4‡ @ 10% THD
Frequency range	transmit: 156.050 to 162.425MHz, receive: 156.050 to 163.275MHz	transmit: 156.050 to 162.425MHz, receive: 156.050 to 163.275MHz
Mounting methods	bracket or flush mount	bracket or flush mount
Display size and type	52mm (2.04") LCD	
Connections:		
NMEA IN sentences supported (NMEA 0183 ver 3.01)	GLL, GGA, RMA, RMC, GNS	GLL, GGA, RMA, RMC, GNS
NMEA OUT sentences (NMEA 0183 ver 3.01)	DSC, DSE	DSC, DSE
TRANSMITTER		
RF power (at 13.6 VDC): hi mode, lo mode	25W, 1W	25W, 1W
Maximum deviation	±5KHz	±5KHz
FM hum and noise level	<-40dB below audio level	<-40dB below audio level
Adjacent channel power	<70dB	<70dB
Spurious/harmonic emissions	<70dBc	<-70dBc
Current drain at 25W (at 13.6V DC)	<6A	<6A
Audio distortion	<10%	<10%
Frequency error	10ppm	10ppm
RECEIVER		
Sensitivity @ 12dB SINAD	0.28uV, typical	0.28µV, typical
Hum and noise	<-40dB below audio level	<-40 dB below audio level
Audio distortion	<10%	<10%
Adjacent channel rejection	>70dB, typical	>80dB, typical
Intermodulation rejection ratio	>68dB, typical	>80dB, typical
Spurious image rejection	>70dB	>80dB, typical
Squelch sensitivity @ tight	<1uV	<1µV
Squelch sensitivity @ threshold	<0.28uV	<0.28µV
Current drain	<0.5A, standby	<6A

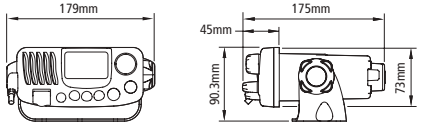
Ordering Information

RAY49E	
E43035	Ray49E VHF radio – grey
E43035-UK	Ray49E VHF radio – grey – UK
E43039	Ray49E VHF radio – white
E43039-UK	Ray49E VHF radio – white – UK

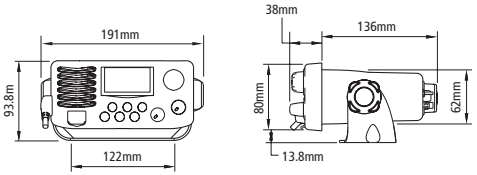
RAY49E ACCESSORIES	
A46053	Rear flush mount kit

RAY55E	
E43037	Ray55E VHF radio
E43037-UK	Ray55E VHF radio – UK

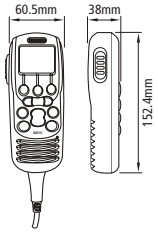
RAY55E ACCESSORIES	
A46052	RayMic second station
A46053	Rear flush mount kit
A46055	RayMic extension cable – 5m
A46056	RayMic extension cable – 10m
A42119	Front flush mount kit



RAY49E



RAY55E



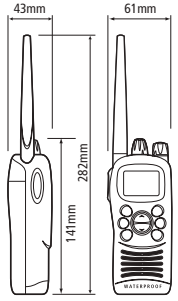
RAYMIC SECOND STATION

Pages 86 – 87 for product information

For Cables & Accessories see page 120

Ray101E VHF Radio

GENERAL	RAY101E
Power:	
Nominal voltage (volts DC)	7.2V
Absolute voltage range/batteries	6x AA Alkaline or AA NiMH – 1300mA/H
Physical:	
Overall dimensions (WxHxD) mm	141x61x43 (without antenna)
Product weight kg (lbs)	0.36 (0.79)
Mounting methods	handheld/belt clip/wrist strap/charger base
Control types	2 rotary knobs for squelch & volume 8 dedicated keys
Control type (fist mike)	✗
Distress button	✗
Display size and type	38mm (1.5") LCD
Backlighting	✓
Adjustments	✓
Connections:	
NMEA 0183 input	✗
Speaker jack output	✗
Transmitter Specification	
Output power (high/low) watts	5W, 1W
Current drain	high power <= 1.8A, low power <= 0.7A
Receiver Specification	
Current drain	max power 200mA, standby 40mA



RAY101E

Ordering Information

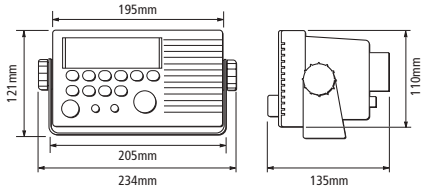
HANDHELD VHF - RAY101E	
E43028	Ray101E handheld VHF
E43028-UK	Ray101E handheld VHF – UK
T43029	Ray101E with power adaptor – UK
T43030	Ray101E with power adaptor – AUS/NZ
T43031	Ray101E with power adaptor – EU

RAY101E ACCESSORIES	
E46038	Type D power adaptor – UK
E46039	Type C power adaptor – AUS/NZ
E46041	Type B power adaptor – EU

For Detailed Specifications visit **www.raymarine.co.uk**

Ray430 Loudhailer with Intercom

GENERAL	RAY430
Power:	
Nominal voltage (volts DC)	12V system
Absolute voltage range (volts DC)	10.8 – 16 volts
Power consumption (typical) amps	max 5 amps at 13.6V DC
Physical:	
Primary handset	**fist microphone**
Overall dimensions (WxHxD) mm	63x85x38
Product weight kg (lbs)	0.13 (0.3)
Mounting methods	cradle/hand held
Control type	push to transmit button
Base transceiver unit	**full function base station**
Overall dimensions (WxHxD) mm	195x110x135
Product weight kg (lbs)	1.9 (4.3)
Mounting methods	surface or bracket
Control type(s)	10 backlit buttons and 3 rotary knobs
Display size and type	64mm segmented LCD
Display lighting	variable lighting
Ancillary items (1)	**hailer horn**
Power output	30 W
Hailer output impedance	8 ohms
Overall dimensions (WxHxD) mm	165x280x216
Product weight kg (lbs)	1.8 (4.1)
Mounting methods	surface or bracket
Ancillary items (2)	**intercom speaker**
Intercom speakers	4 W
Intercom speaker impedance	8 ohms
Overall dimensions (WxHxD) mm	112x97x55
Product weight kg (lbs)	0.34 (0.75)
Mounting methods	bracket
Control type	push button
SYSTEM OPTIONS	
Multi-station option	base unit and up to 4 remote intercom speakers
External loud speaker	base unit/remote speaker/hailer horn
Intercom option (2 way)	with remote intercom speakers
Auxiliary mode (transmission of external audio)	auxiliary input via AUX 1 and 2
Built in alarm (intrusion, bilge or other)	external alarm interface
Remote microphone	✓



RAY430

Ordering Information

LOUDHAILERS	
M95997A	Ray430 loudhailer – without hailing horn
M95435	Hailing horn speaker
M95998	Intercom speaker

GOTO Page 87 for product information

Cables and Accessories

SEATALK CABLE ACCESSORIES

D187	SeaTalk flat to male round connector
D188	SeaTalk flat to female round connector
D244	3 way SeaTalk junction box
E25028	ST40 interconnect kit

DSM30/300 CABLES

E65010	C Series cable – 3m
E65011	C Series cable – 10m
E65009	(hsb) to C Series cable – 3m
E05016	(hsb) to C Series cable – 10m
E66009	Transducer extension cable – 3m
E66010	Transducer extension cable – 5m
E66022	Speed / temperature 'Y' cable
E66066	DSM transducer to A Series cable
D234	Paddle wheel kit ST800 / ST600
R69081	hsb² adaptor (3pin to 4 pin)
R69053	power cable – 3m

SEATALK² CABLES FOR ST290 PLUG TO PLUG

E25036	SeaTalk² cable – 400mm plug to plug
E25038	SeaTalk² cable – 10m plug to plug
E25040	SeaTalk² cable – 1m plug to plug
E25042	SeaTalk² cable – 3m plug to plug
E25043	SeaTalk² cable – 5m plug to plug
E25044	SeaTalk² cable – 20m plug to plug

SEATALK² CABLES FOR ST290 PLUG TO BARE WIRE

E25041	SeaTalk² – 1m plug to wire
E25039	SeaTalk² – 10m plug to wire
E25037	SeaTalk² – 400mm plug to wire

SEATALK² CABLE ACCESSORIES

E25045	SeaTalk² cable plug boots (pack of 5)
E25046	SeaTalk² junction box blanking plugs
E25047	SeaTalk² cable – 200m reel
E25048	SeaTalk² bus terminator
E25049	SeaTalk² junction box – 5 way

E AND C SERIES RADOME CABLES

E55067	Right-angled end radome cable (2kW only) – 10m
E55068	Right-angled end degree radome cable (2kW only) – 15m
M92720	Straight end radome cable (2kW only) – 15m
E55074	Right-angled end radome cable (2kW & 4kW) – 5m
E55065	Right-angled end radome cable (2kW & 4kW) – 15m
E55066	Right-angled end radome cable (2kW & 4kW) – 25m
M92668	Straight end radome cable (2kW & 4kW) – 15m
M92669	Straight end radome cable (2kW & 4kW) – 25m

E AND C SERIES OPEN ARRAY CABLES (SPLIT)

E55069	90° split pedestal adaptor cable – 2.5m
E55075	90° split pedestal cable – 5m
E55063	90° split pedestal cable – 15m
E55064	90° split pedestal cable – 25m

E AND C SERIES RADAR EXTENSION CABLES

E55071	90° extension cable – 5m
E55072	90° extension cable – 10m

RADAR ACCESSORIES

M92722	Mast-mount 18" radome (scanner)
M92698	Mast-mount 24" radome (scanner)

C AND E SERIES ACCESSORIES

E05012	Trunnion-mount kit (SeaTalk² keyboard)
E55049	SeaTalk^{hs} network cable – 1.5m
E55050	SeaTalk^{hs} network cable – 5m
E55051	Ethernet cable – 10m
E55052	SeaTalk^{hs} network cable – 20m
E55053	E Series SeaTalk²/NMEA 2000 cable – 1.5m
E55054	E Series SeaTalk/alarm out cable – 1.5m
E55055	Video out cable – 10m
E55056	Video out cable –20m
E55057	Video in cable – 1.5m
E55058	SeaTalk^{hs} network switch
E55060	SeaTalk^{hs} crossover coupler
E55061	SeaTalk² navigation keyboard
E55062	S-Video cable – 1.5m
E65011	DSM300 to C Series cable – 10m
E05026	Micro C Devicenet adaptor cable 0.4m female
E05027	Micro C Devicenet cable 0.4m male
A06026	E Series Devicenet cable 1.5m male
A06027	C Series Devicenet cable – 1.5m male
A06062	C Series Devicenet cable – 1.5m female
A62125	C90w Flush mount kit
A62126	C120w Flush mount kit
A62127	C140w Flush mount kit
A62132	C90w Trunnion Mounting Kit
A62133	C120w Trunnion Mounting Kit
A62134	C140w Trunnion Mounting Kit
R08004	C Series NMEA cable – 1.5m
R08050	C Series SeaTalk cable – 2m
E26033	Auxiliary alarm

GPS ACCESSORIES

E35018	Raystar125 pole mount bracket
E36013	Raystar125 antenna conversion cable
R38104	Raystar125 antenna cable

NAVIGATION AIDS ACCESSORIES

E36011	TNC/coaxial extension cable – 10m

SOFTWARE ACCESSORIES

E85001	SeaTalk/NMEA/PC interface box
E86001	PC serial cable

G SERIES ACCESSORIES

A06039	SeaTalk^{ng}/NMEA2000 spur cable – 1.5m
E06054	SeaTalk^{hs} patch cable – 1.5m
E06055	SeaTalk^{hs} patch cable – 5m
E06056	SeaTalk^{hs} patch cable – 10m
A62136	SeaTalk^{hs} patch cable – 15m
E06057	SeaTalk^{hs} patch cable – 20m
R08275	GVM400 audio cable – 1.5m
R08274	GVM400 S-Video cable – 1.5m
R08130	VGA cable – 1.5m
R08174	VGA cable – 5m
R08296	VGA cable – 10m
R08297	VGA cable – 20m
E06021	DVI-D cable – 5m
E06022	DVI-D cable – 10m
R06053	DVI to VGA (analogue) cable – 0.5m
R08266	G Series audio out cable – 3m
R08298	G Series audio out cable – 15m
R08181	G120 suncover
R08182	G150 suncover
R08183	G170 suncover
R08184	G190 suncover

INSTRUMENT ACCESSORIES

A28132	ST290 digital display mounting bracket
A28136	ST290 keypad mounting bracket
A28137	ST290 keypad suncover
R28102	ST290 graphic/data suncover
D216	ST290 masthead cable – 50m
R28198	ST70 suncover
R28199	ST70 mounting bracket
A22123	ST60+ to ST70 bracket adaptor
A25001-P	ST60+ fascia bezel
A25002-P	ST60+ flush-mount fascia bezel
A25003-P	ST60+ flush-mount kit
A25004-P	ST60+ suncover (standard)
A25005-P	ST60+ suncover (flush-mount)
A28042	ST60+ extension cable (wind transducer) – 50m
D284	ST40/ST60+ extension cable – 1m
D285	ST40/ST60+ extension cable – 3m
D286	ST40/ST60+ extension cable – 5m
D287	ST40/ST60+ extension cable – 9m
E25051	ST40/ST60+ extension cable – 12m
D288	ST40/ST60+ extension cable – 20m
R28170	ST60+ short arm wind masthead transducer
R28171	ST60+ long arm masthead transducer
A28162	ST60+ mast cable & connector – 30m
A28163	ST60+ mast cable & connector – 50m
E25009	ST60+ trunnion-mount kit
E25054	ST60+ to ST60 bezel adaptor kit – compass
E25055	ST60+ to ST60 bezel adaptor kit – rudder/ wind
E25056	ST60+ to ST60 bezel adaptor kit – CH/wind
E25057	ST60+ to ST60 bezel adaptor kit – depth
E25058	ST60+ to ST60 bezel adaptor kit – speed
E25059	ST60+ to ST60 bezel adaptor kit – tridata
E25060	ST60+ to ST60 bezel adaptor kit – graphic
E25024	ST40 control unit mounting bracket
E25027	ST40 suncover

ST70 CABLES

A06028	SeaTalk^{ng} T-piece
A06030	SeaTalk^{ng} extender
A06031	SeaTalk^{ng} backbone terminator
A06033	SeaTalk^{ng} backbone cable – 400mm
A06034	SeaTalk^{ng} backbone cable – 1m
A06035	SeaTalk^{ng} backbone cable – 3m
A06036	SeaTalk^{ng} backbone cable – 5m
A06037	SeaTalk^{ng} backbone cable – 20m
A06038	SeaTalk^{ng} spur cable – 400mm
A06039	SeaTalk^{ng} spur cable – 1m
A06040	SeaTalk^{ng} spur cable – 3m
A06041	SeaTalk^{ng} spur cable – 5m
A06042	SeaTalk^{ng} elbow spur cable – 400mm
A06045	Devicenet adaptor cable – female
A06046	Devicenet adaptor cable – male
A06047	SeaTalk adaptor cable – 3-pin
A06049	SeaTalk^{ng} power cable
A06064	SeaTalk^{ng} 5 way connector
A06032	Blanking plug
A06043	Spur to stripped end cable – 1m
A06044	Spur to stripped end cable – 3m
A06048	SeaTalk² adaptor cable – 5 pin
A06061	E Series to SeaTalk^{ng} adaptor cable
A06062	SeaTalk² to cable – female

SATELLITE STV ACCESSORIES

E96013	60STV empty dome/base plate
E96009	45STV empty dome/base plate
E96016	37STV empty dome/base plate
E96006	45STV power cable to ACU – 30m
E96007	45STV cable ACU to antenna – 30m
R08135	RF cable – 15m
E96008	RF cable – 30m

AUTOPILOT ACCESSORIES

A15001-P	ST7002 suncover (surface mount)
A18097-P	ST8002 suncover (surface mount)
A25004-P	ST6002 suncover (surface mount)
E12102	Smart heading sensor (gyro compass system)
D003	Pushrod extension – 25mm (1")
D004	Pushrod extension – 51mm (2")
D005	Pushrod extension – 76mm (3")
D006	Pushrod extension – 102mm (4")
D007	Pushrod extension – 127mm (5")
D008	Pushrod extension – 153mm (6")
D009	Tiller bracket – 25mm (1")
D010	Tiller bracket – 51mm (2")
D011	Tiller bracket – 76mm (3")
D159	Tiller bracket – 102mm (4")
D160	Tiller bracket – 127mm (5")
D031	Cantilever socket
D026	Pedestal socket – 38mm (1.5")
D027	Pedestal socket – 51mm (2")
D028	Pedestal socket – 64mm (2.5")
D029	Pedestal socket – 76mm (3")
D030	Pedestal socket – 89mm (3.5")
D002	Mounting socket (pack of 5)
D014	Small thread tiller pin (pack of 5)
D001	Tiller pin (pack of 5)
D021	Long thread tiller pin (pack of 5)
A18089	S1 wheel single spoke clamp
E15017	S1 wheel drive flat pedestal kit
E15018	S1 wheel drive GOIOT installation kit
D337	ST1000/ST2000+ tiller pilot plug 6 pin
D338	ST1000/ST2000+ tiller pilot socket 6 pin
D339	ST1000/ST2000+ tiller pilot plug and socket 6 pin

INBOARD AUTOPILOT ACCESSORIES

D143	Rudder reference ball joint kit
D228	Linear feedback fittings pack
D250	ST steel rudder reference ball pin
E15020	S1 course computer only
E15021	S1G course computer only
E15013	S2 course computer only
E15015	S2G course computer only
E15014	S3 course computer only
E15016	S3G course computer only
M81166	D.P. check valve
M81167	Solenoid – 12V
M81168	Solenoid – 24V
M81188	Linear feedback transducer

COMMUNICATION ACCESSORIES

E45011	Ray240E extension cable – 3m
E45012	Ray240E extension cable – 5m
E45013	Ray240E extension cable – 10m
E45014	Ray240E bulkhead mounting kit
R42124	RayMic cable with jack point – 10m
R49134	Ray240E power cable
E46038	Ray101E mains 240V power adaptor – UK
R49086	Ray101E antenna
R49088	Ray101E battery tray
R49089	Ray101E quick charger base
R49092	Ray101E cigarette light adaptor cable
R49097	Ray101E belt clip
R49098	Ray101E wrist strap
A46053	Rear flushmount kit – Ray218E/Ray49E
A46054	Mic relocation kit – Ray218E/Ray55E – 5m
A46055	RayMic extension cable – Ray218E/Ray55E – 5m
A46056	RayMic extension cable – Ray218E/Ray55E – 10m
A46060	Front flush mount kit – Ray218E
A42119	Flush mount kit (front mounting type) – Ray55E
A46052	RayMic second station – Ray218E/Ray55E
E46026	Handset relocation kit

A SERIES ACCESSORIES

A62154	A50/57/70 panel mount kit

CAMERA ACCESSORIES

E06017	Camera extension cable – 5m
E06018	Camera extension cable – 15m
R08200	CCTV suncover
R08201	CCTV mount
R08202	CCTV power adaptor cable

Raymarine Manufacturer's Warranty

In order to ensure that a Raymarine product continues to operate efficiently and reliably, before use the user should carefully read the Owner's Handbook and follow the advice on the safe and correct operation and use of each Raymarine product. It is recommended that Raymarine products are installed and/or commissioned by a Raymarine certified installer. Installation and/or commissioning by persons other than a Raymarine certified installer may invalidate this warranty.

Important note: All Raymarine products are merely aids to navigation. It is the ultimate responsibility of the user to exercise discretion and proper navigational skill independent of any Raymarine product.

Standard warranty

Subject to the terms, conditions and limitations in this limited warranty ("warranty"), Raymarine new products are warranted to be free from defects in materials and workmanship for the following period (the "Warranty Period"):

VHF radios:	36 months from Date of first purchase.
All other products:	24 months from Date of first purchase.

"Date of first purchase" means the date on which the product was purchased by the first retail customer or where the product was installed and/or commissioned on a new vessel by a Raymarine certified original equipment manufacturer, the date on which the vessel was purchased by the first retail customer. For products installed by a Raymarine certified installer on a vessel already in the customer's possession, the Warranty Period will begin on the date of product installation or commissioning.

"Raymarine certified original equipment manufacturer"; "Raymarine National Distributor"; "Raymarine certified installer" and "Raymarine certified service agent" are certifications given by Raymarine. For details of such certified parties, please refer to **www.raymarine.co.uk**

Raymarine will (at its sole option) repair or replace any product which is (i) proven to be defective in materials or workmanship; and (ii) returned to Raymarine (or its agent) during the Warranty Period in accordance with this warranty. Replacement products may be new or refurbished. Such repair or replacement will be the sole remedy by Raymarine under this warranty. Any repaired or replacement product will be warranted in accordance with this warranty, for the unexpired balance of the Warranty Period on the original product.

Obtaining standard warranty service

To qualify for standard warranty service, the product must be returned to Raymarine or a Raymarine certified service agent within: (i) the Warranty Period; and (ii) 30 days of the alleged product failure. The product must be securely packaged and sent pre-paid, accompanied by:

- an original valid proof of purchase confirming the date of purchase and product supplier or a stamped warranty card completed by the product supplier; and
- the product serial number.

It is recommended that the customer obtains postal insurance for products that are returned under this warranty. Raymarine will not be liable for loss or damage to products in transit to Raymarine.

Onboard warranty service

Where proof of installation and/or commissioning by a Raymarine certified installer can be shown (or onboard warranty service has been purchased separately) Raymarine will authorize limited onboard warranty service to the vessel by the Raymarine certified service agent nearest to the vessel, subject to the limitations and exclusions below.

Certain Raymarine products are not eligible for onboard warranty service unless (i) at the time of alleged product failure, the products are pre-registered with Raymarine and (ii) onboard warranty service is purchased from a Raymarine certified installer at the time of installation. Onboard warranty service is only available to purchase in certain countries. For details of such products and countries please refer to **www.raymarine.co.uk** or contact the nearest Raymarine National Distributor.

With the exception of autopilots, a Raymarine product or system sold in the Americas or the Caribbean that has a Manufacturer's Suggested Retail Price (MSRP) of less than USD $2,500 is not eligible to receive onboard warranty service. Autopilots (other than sport, tiller and wheel pilots) sold in the Americas or the Caribbean are eligible for onboard warranty service irrespective of MSRP. Unless sold as part of a system with an MSRP in excess of USD$2,500, sport, tiller and wheel pilots are eligible for standard warranty only and are not eligible for onboard warranty service.

Obtaining onboard warranty service

To qualify for onboard warranty service, the nearest Raymarine certified service agent should be contacted and onboard service requested by the customer: (i) within the Warranty Period; and (ii) within 30 days of the alleged product failure. At the time of request, the customer must supply the following to the agent:

- an original valid proof of purchase confirming the date of purchase and supplier name or a warranty card completed and stamped by the Raymarine certified service agent/installer;
- proof of installation by a Raymarine certified service agent/installer; and
- the product serial number.

Onboard warranty service will only be performed if the serial number confirms that the product has been installed and/or commissioned by a Raymarine certified installer or that onboard warranty service has been purchased and is valid and in force.

Warranty limitations & exclusions

In addition to any other limitations and exclusions in this warranty, Raymarine is not responsible for, and this warranty does not cover:

- failure or defects due to accident, abuse or misuse, shipping damage, alterations, corrosion, incorrect and/or non-authorized service or improper installation (whether or not by a Raymarine certified service agent) or failure to comply with the Owner's Handbook;
- products where the serial number has been altered, mutilated or removed;
- costs associated with routine system checkouts, software revisions, alignment/calibration, sea trials or commissioning unless required by replacement of parts in the area being aligned;
- repair or replacement of consumable items including (without limitation) fuses, batteries, drive belts, radar mixer diodes, snap-in impeller carriers, impellers, impeller bearings and impeller shafts. A complete list of the consumable items relating to each product can be found in the Owner's Handbook or at **www.raymarine.co.uk**;
- all costs associated with transducer replacement, other than the cost of the transducer itself;
- costs associated with overtime or premium labor work outside normal working hours;
- differences in material, coloring or size that may exist between actual products and the pictures or descriptions of such products in product advertising, literature or on the Internet;
- replacement of missing components from the package of any product purchased through an Internet online auction site;
- fees associated with hauling, shipping or towing a vessel to a Raymarine certified service agent;
- taxi fares, launch or docking fees, aircraft or vehicle rental, meals, customs, shipping, communication charges;
- other travel or transport costs (save for onboard warranty service, where costs of up to 2 hours' auto mileage and tolls of service agent travel time are covered);

Raymarine accepts no responsibility for damage to other equipment, systems or components occasioned by improper or unauthorized connection or use of the product.

Subjecting any Raymarine product to high pressure washing may cause subsequent water intrusion and failure of the product. Raymarine will not warranty product subjected to high pressure washing.

Other Conditions

TO THE EXTENT CONSISTENT WITH LAW, THE FOREGOING WARRANTY IS RAYMARINE'S SOLE WARRANTY. THE PROVISIONS OF THIS WARRANTY ARE IN LIEU OF ANY OTHER WARRANTY, WHETHER EXPRESSED OR IMPLIED, WRITTEN OR ORAL, INCLUDING ANY WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE.

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